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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII — CLEVELAND, OHIO, MAY 19, 1904 — NUMBER 20

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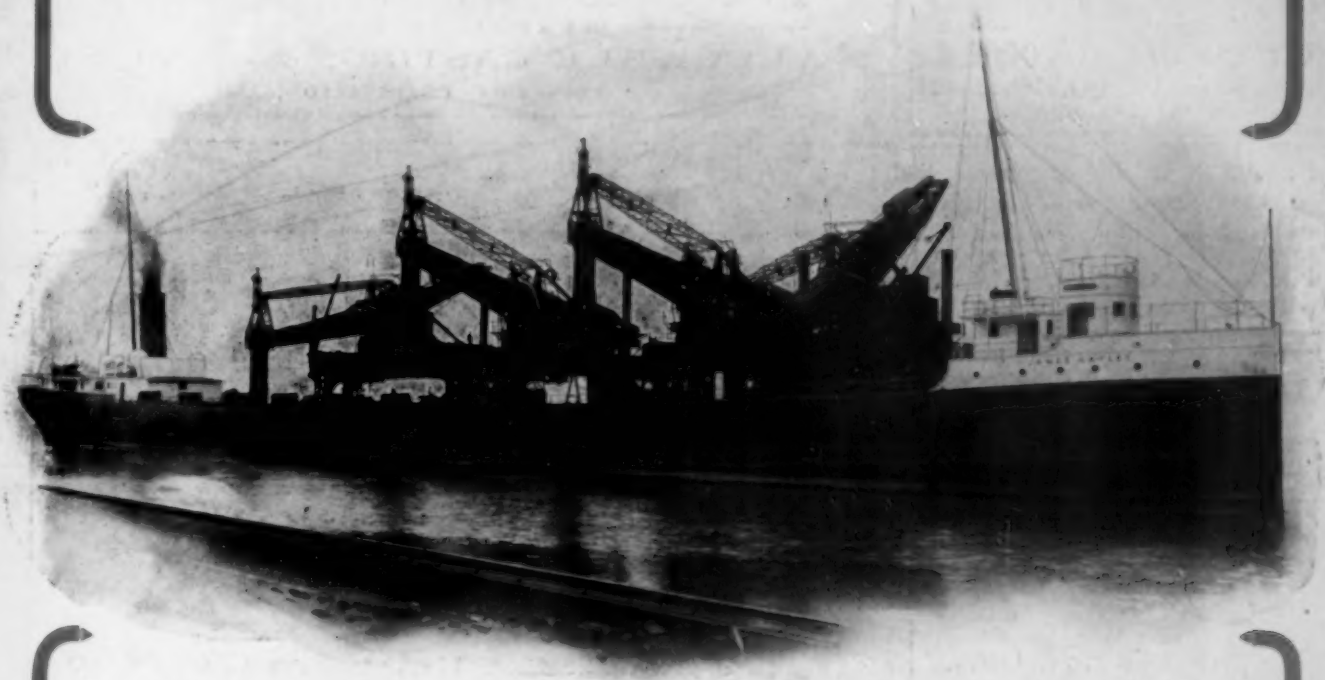

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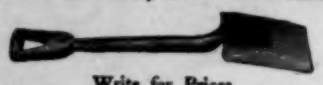

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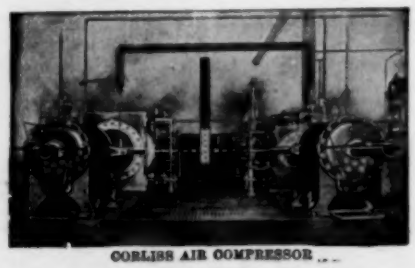

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, MAY 19, 1904 NUMBER 20

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

While the iron trade drifts, with pig iron declining, the developments in respect to ore traffic on the lakes have reached a point from which they may soon pass to a position of first importance. The masters and pilots have taken a stand that now threatens a stubborn strike and this makes the question of ore supply of immediate interest. In addition to the 4,500,000 tons of ore officially reported as on dock at Lake Erie ports on May 1, careful estimates (but not based on official figures) put the amount of Lake Superior ores in furnace yards on that date at close to 7,000,000 tons. The reduction in the past two weeks makes the amount of such ore now available about 10,500,000 tons, or somewhat less than a five months' supply at the present rate of consumption. Some merchant furnaces in the Central West are preparing to blow out in the next few weeks, so that ore consumption will be reduced to that extent. While the above 10½ million tons of ore will run the furnaces into October, if evenly apportioned, there are interests whose furnaces would be forced to stop much before that, for lack of ore. In addition to the demand that wages in many cases be raised on a declining market, the issues between the masters' and pilots' union and the lake carriers involve the principle of pay according to service and merit, and the owners are taking a very firm stand. It is a struggle that may easily grow to national importance. Meantime the ore market is as dull as it could well be. Furnaces want to see what level prices will go. The United States Steel Corporation, while free to sell or exchange ore, is not likely to find any inducement to become a seller on such a level as this year's.

Pig iron centers report lower prices and little inclination by consumers to consider purchases for the third quarter. The statistical showing for May 1 was unexpectedly good—an increase in production in April of 106,000 tons from that of March, accompanied by a decrease in stocks of 14,000 tons. On May 1 the production of coke and anthracite iron was at the rate of 19,000,000 tons a year, and all apparently going into consumption, though there is, of course, the undetermined factor of stocks in consumers' hands. Southern iron is freely offered at $9.50 for No. 2 foundry, Birmingham, and sales on analysis have been at the equivalent of $9.25. A Southern Ohio purchase of 1,000 tons brought out some low prices both for Northern and Southern irons. The Bessemer pig iron market is inactive, and the blowing out of two Central Western merchant furnaces this month is arranged for, with the expectation that further curtailment will come early in June. The negotiations for 50,000 tons of Bessemer iron for the Lake Superior Co.'s steel plant at Sault Ste. Marie, Ont., are practically completed, but none of the iron will come from Lower Lake furnaces. The company is also reported in the market for a large tonnage of coke. Steel Corporation furnaces are still run at nearly full capacity and about three-fourths of the total increase in pig iron production in April over March was by furnaces of steel companies. The Frick Coke Co. now has 82 percent of its capacity active, and all indications point to full operation of Steel Corporation furnaces as well as steel works to the middle of the year.

The quietness in pig iron is shared by finished products. In unfinished steel there are still reports of lower than association prices and the situation in ore and in Bessemer iron points to no improvement in billets. Rail business in the week includes 20,000 tons sold by the Lackawanna Steel Co. The light rail trade is still drooping. Orders for 1,800 steel cars are reported in the Pittsburg district, but there is no encouragement for plate mills in the shipyard situation, which has not been so dull in years. For the Wabash bridge at Pittsburg 5,000 tons of steel will be neded, and the same road has contracted for 12,000 tons for its Monongahela warehouses. The 20,000 tons of steel for Montreal wharf sheds is still unplaced. The wrought pipe trade continues in a flourishing condition, with the wire business a fair second. The competition of the Colorado mill is beginning to be felt in the wire trade of the farther West.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 429 PARK BUILDING, May 18.

While new business in most finished lines continues light, and specifications on existing contracts are by no means heavy, none of the local mills have as yet been compelled to curtail output, although a continuation of the present lull will certainly result in the light running of many mills in the near future. Officials of the United States Steel Corporation for the present at least do not anticipate curtailing their pig iron production, which together with the coke production in the Connellsville region at the present time is at its maximum. This week the H. C. Frick Coke Co. has 82 percent of its capacity in the Connellsville region in operation and the intentions are to continue at this rate at least until July 1, which would indicate that the Steel Corporation plants are practically all expected to run at the present capacity until that time At Youngstown, O., the Bessemer plant of the Republic Iron & Steel Co. resumed operations in full this week after a week's idleness, sufficient orders having accumulated to insure operations for some time. On the other hand the Carnegie Steel Co. is only operating the South Sharon open-hearth plant single turn, this week the requirements of the wire and nail mills at that plant not being as heavy as in the past four months. While the American Steel & Wire Co. blew out its Neville Island furnace this week, the Carnegie Steel Co. blew in another stack at Youngstown, O., which makes no change in the number of active furnaces of the Steel Corporation. On the other hand two merchant furnace operators in the Valleys are already preparing to blow out, while two more stacks are scheduled to go out in about ten days. Other merchant furnaces will follow early in June.

Despite this lull there are occasional large orders which will help to support the summer's tonnage. On Thursday the Wabash railroad will open bids for the structural work on its South Side elevated branch requiring about 5,000 tons of material, while the order for the steel required in the erection of the warehouses on the Monongahela river amounting to 12,000 tons has already been placed, although the name of the successful bidder cannot be learned at this time. The Wheeling Mold & Foundry Co. has not yet placed its order for iron to cover its contract for tunnel castings, and this business may be delayed until

after the first of next month, as additional iron will be required if an additional portion of the tunnel contract is accepted, on which it reported an option has been given. The Consolidated Lake Superior Co. is still negotiating for the purchase of 100,000 tons of coke, while a large portion of its Bessemer iron requirements have already been practically provided for with a furnace in the Northwest, Valley furnaces not having been invited to submit offers. The Wabash railroad has closed for the purchase of 1,500 steel cars with the Pressed Steel Car Co., which will add about 15,000 tons to the light plate tonnage received by the mills thus far this year. The Buffalo, Rochester & Pittsburg railroad has also placed an order with the American Car & Foundry Co. for 300 steel cars, 400 wooden gondolas and 250 drop bottom gondolas.

The pig iron market is lifeless, an occasional order for a carload of foundry iron being placed. The outside figure on No. 2 foundry, Pittsburg, is $13.35 and there is little doubt that this could be shaded 25 cents a ton on a desirable tonnage. Demand for merchant and line pipe continues good, one order for 5,000 tons of line pipe having been placed with local mills this week. Demand for tin plate is heavy, while low prices continue to rule on sheets.

Pig Iron.—Owing to the few transactions the quotations on nearly all grades are practically nominal. On No. 2 foundry the outside price is $13.35, while Valley furnaces would no doubt do $12.25 at the furnace on a desirable tonnage. There is no demand for Bessemer iron and quotations are nominally $13.35, Pittsburg. This price could also be shaded materially on a desirable order. Southern No. 2 is being offered her at $9.50 Birmingham or $13.85 delivered, but no sales are reported. On Northern forge $12.75, Pittsburg, can be readily done. According to information at hand at present four active Valley stacks will be on the idle list within the next two weeks and other Valley stacks will follow early in June. On the other hand there is no indication that the United States Steel Corporation will curtail production in the near future, the blowing out of the Neville Island furnace being offset by the blowing in of furnace No. 3 at Youngstown. We revise quotations as follows:

Bessemer, Valley	$12 40 to 12 50
Bessemer, Pittsburg	13 25 to 13 35
No. 1 Foundry	13 60 to 13 75
No. 2 Foundry	13 25 to 13 35
Gray forge, Pittsburg	12 75
Chilled basic, Valley	12 40 to 12 50
Chilled basic, Pitsburg	13 25 to 13 35

Steel.—Agreed quotations continue to be shaded on offers of both open-hearth and Bessemer billets and sheet bars. The large steel producers are however maintaining agreed prices, but no large tonnages have been recently offered which would invite any shading on the part of the largest producers. Agreed prices which are being shaded from 50 cents to $1 per ton are as follows: Bessemer and open-hearth billets, 4 x 4 inches, and slabs, up to and including 0.25 carbon, $23 Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O. and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance; and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheets and tin bars are $1 per ton extra. Bessemer and open-hearth rods are still quoted at $30 to $31 Pittsburg.

Ferro-Manganese.—English ferro is held at $43 to $43.25 delivered Pittsburg, and at these prices is unable to compete with the domestic product in this district or west of here. Domestic ferro, 80 percent is held at $41.50 to $42.50, delivered at buyer's mill east of the Mississippi according to quantity.

Spelter.—Prime Western grades are held at 5.10c, Pittsburg, in carload lots.

Muck Bar.—There have been no recent sales of muck iron and quotations are nominally $25 to $25.50 for neutral bars.

Skelp.—Pipe mills are taking all the skelp that the mills can produce and the operation of these mills at their fullest capacity until the middle of the year is assured. Steel skelp, grooved and sheared is held at 1.35c to 1.40c, while grooved iron is held at 1.42½c to 1.45c, and sheared at 1.50c.

Rails and Track Materials.—Little new business in standard section rails has been placed during the week, while the tonnage in light rails is meager. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; 16 to 40 pounds, $22.50 to $23. Track material: Spikes, 1.65c to 1.70c.

Plates.—Orders for about 1,800 steel cars have been placed during the week requiring nearly 20,000 tons of plates. Orders from the shipbuilding interests, however, are practically nil and but for this work for steel cars many of the plate mills would be compelled to shut down entirely. At present most of them are operating about half time. We quote: Tank plates, ¼ inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c marine, ordinary fixebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.85c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 10 inches, 5c extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Structural Material.—The reports that the export department of the United States Steel Corporation has received the order for steel for the Montreal wharves is denied. The order has not yet been placed. It calls for about 20,000 tons of material. The general contract for the erection of the sheds on the wharves as noted last week has been placed but the steel work has not yet been sublet. On Thursday the Wabash railroad will open bids for the erection of its elevated tracks on the South Side, requiring about 5,000 tons of structural material. The order for the structural work for the 38 warehouses on the Monongahela, calling for 12,000 tons has already been let. Quotations remain unchanged: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Bars.—New business is light, while specifications on old contracts are not nearly what is expected at this season of the year. We make the following quotations: Bar iron, 1.35c to 1.40c Pittsburg, for local delivery, while for Western shipment quotations are based on 1.25c to 1.30c Pittsburg. Hoops are held at 1.40c base, and bands at 1.35c taking bar extras. Bessemer steel bars, 1.35c; open-hearth, 1.40c; plow beams and cultivator beams, 1.35c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.45c. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance.

Sheets.—Considerable business is being placed, but competition is keen and low prices are ruling. On carload lots, 2.20c continues to be freely done on 28 gauge. Black sheets, one pass through cold rolls, are held as follows: No. 8, 1.75c to 1.80c; No. 9, 1.80c to 1.85c; Nos. 12-14, 1.90c; Nos. 15-17, 1.95c; Nos. 18-21, 2c; Nos. 22-24, 2.05c; Nos. 25-26, 2.10c; No. 27, 2.15c; No. 28, 2.20c to 2.25c; No. 29, 2.50c to 2.55c; No. 30, 2.60c to 2.65c. Galvanized: Nos. 12 17, 2.35c; Nos. 18-21, 2.50c; Nos. 22-24, 2.65c; Nos 25-26, 2.85c; No. 27, 3c; No. 28, 3.20c; No. 29, 3.60c; No. 30, 4c.

Wire and Wire Nails.—New business is not nearly as heavy as earlier in the year and when present orders are filled many of the local mills will curtail production to some extent until the middle of the year, when a number will shut down which is done every year. A meeting of the cut nail association will be held on Thursday but no change in prices is expected. Quotations arre unchanged: Wire nails, carload lots to jobbers, f. o. b. cars Pittsburg, are quoted $1.90 base; plain wire, carload lots, $1.80 base; barb wire, carload lots, $2.20 base; staples, carload lots, $2.05 keg. Galvanized, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut nails, carload lots, $1.75, and less than carload lots, $1.80 f. o. b. Pittsburg, plus freight to points of destination. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—Some business is being closed for delivery after July 1, but on the whole the market is quiet. We make the following quotations: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.65c; plow steel, 6 inches and under, 1.40c for Bessemer and 1.45c for open-hearth; plow slabs, ¼ inch and heavier, 1.65c. The demand for shafting on the part of the machinery manufacturers is not heavy, and tonnage has therefore been considerably affected. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carloads.

Pipes and Tubes.—Demand for all kinds of material continues good, especially line pipe, one order for 5,000 tons having been taken this week. Discounts to consumers, carload lots f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch	68	58	66	56
½ inch	71	61	69	59
⅝ to 6 inch	75	65	73	63
7 to 12 inch	71	61	68	58
Ex. Stg., plain ends, ¼ to 8 in.	67	57	64	54
Double Ex. Stg., pl. ends, ½ to 8 in.	59	49	56	46

BOILER TUBES.

	Steel.	Iron
1 to 1½ inch	42½	39
1¾ to 2¼ inch	55½	28
2½ inch	58	43
2¾ to 6 inch	64½	50½
6 to 13 inch	55½	28

Old Material.—The market continues quiet and quotations on nearly all kinds of scrap are merely nominal. Heavy melting stock has been offered this week at $12.25, but the mills are not interested, and it is doubtful if $12 would find buyers. Cast scrap is quoted at $9.25, while rerolling rails are held at $13.

Coke.—The H. C. Frick Co. is not curtailing production, 82 percent of its ovens in the upper and lower Connellsville field being in operation at present, and from all indications will continue to operate until July. On the other hand a number of smaller operators are preparing to shut down owing to the low prices that are ruling and which net them no profit. Furnace coke is held at $1.45 to $1.50. and foundry at $1.90 to $2. A few grades of foundry coke still command from $2.25 to $2.50. The coal market in this district is badly demoralized owing to the non-shipment of coal from lower lake docks. Run of mine Pittsburg vein coal has sold during the week at prices ranging from 90 cents to $1 a ton, while excellent gas coal in the Connellsville region has been offered at 85 to 90 cents. These are the lowest prices that have been ruling on coal since the organization of the Pittsburg Coal Co., and it is generally believed that the low prices will only rule temporarily and that they will again advance as soon as the lake shipments commence.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, May 17.

There was little or no life to the trading in metal products during the past week. Such wants as are in the market or that were placed were forced by the actual necessities of consumers. This appears to be the only spur that will bring out an order these days, and in most lines even such wants are light. One well-known representative of a large producing interest said that not in the eighteen years of his connection with the Chicago iron and steel trade had he known business to be so quiet as it was last week and as it opened the first two days of this week.

Yet, notwithstanding the apathy that prevails and the large amount of bearish talk that is current, prices of finished materials hold up remarkably well. Except in sheets and light plates, there is no disposition to shade existing schedules, and the cutting in these products has grown considerably less as a result of the partial withdrawal from the market of those mills that were conspicuous in this respect. Only the lower products, pig iron, coke and scrap, show any marked weakness in values. Southern No. 2 foundry is now selling on the basis of $9.50 Birmingham, while Northern No. 2, though nominally held at $14 Chicago can be bought at $13.50. Spot coke is offered at a variety of prices, some sales having been made during the week at figures slightly above the freight rate. On contracts for future deliveries, however, ovens are holding out for $2 to $2.50, Connellsville. The almost total lack of any demand for scrap makes it impossible to quote correct prices on this material. Each transaction is a law unto itself and the sale made accordingly. Prices, however, are weak and the tendency is downward.

Discouraging though present conditions may be, the optimists in the trade still find material for argument and hope. With the country practically denuded of stocks, they prophesy a heavy movement to cover when once the present sentiment changes. This is looked for as soon as the various causes that have conspired to create it, such as the impending presidential election, the war in the East, and the labor unrest are settled. The railroads are buying somewhat more freely and what business is postponed must ultimately come out.

Pig Iron.—Southern foundry irons have weakened another 25 cents during the week, and No. 2 foundry can now be bought at $9.50 Birmingham. This is not yet a general price, the principal interests asking $9.75, while some isolated stacks are still clinging to the $10 schedule. The lower price has been made on enough sales, however, to establish that figure, and on favorable orders it is being freely quoted. Northern interests are still holding their product nominally at $14 Chicago for No. 2 foundry, but it is not denied that a man with an order in his hand could make a better deal. There is so little iron in demand, however, that the question of price is not taken into serious consideration. Many agents have been advised to take up each transaction with the furnace before quoting on it, and with these instructions there is reason to believe that when iron is really wanted there will be little difficulty in naming a satisfactory price. Some large Southern interests have re-entered the market and are now offering iron for delivery in the next three months, commencing with June, on the basis of $9.75 for No. 2. In the past week transactions closed have been made up entirely of small lots. We quote Chicago delivery as follows:

Lake Superior Charcoal	$15 00 to 15 50
Northern Coke Foundry No. 1	14 25 to 14 75
Northern Coke Foundry No. 2	13 75 to 14 25
Northern Coke Foundry No. 3	13 25 to 13 75
Northern Scotch Foundry No. 1	14 50 to 14 75
Ohio Strong Softeners No. 1	15 50 to 15 80
Ohio Strong Softeners No. 2	14 80 to 15 30
Southern Coke Foundry No. 1	13 65 to 13 90
Southern Coke Foundry No. 2	13 15 to 13 40
Southern Coke Foundry No. 3	12 65 to 12 90
Southern Coke Foundry No. 4	12 15 to 12 40
Southern No. 1 Soft	13 65 to 13 90
Southern No. 2 Soft	13 15 to 13 40
Southern Gray Forge	12 40 to 12 90
Southern Mottled	12 15 to 12 65
Southern Silveries (4% to 6% Silicon)	14 85 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 80
Alabama and Georgia Car Wheel	18 85 to 19 35
Malleable Bessemer	14 00 to 14 50
Alabama Basic	13 65
Virginia Basic	15 80

Billets.—The demand is limited to strictly routine business, some mills reporting that they have not closed a sale in the past week. Assurances are given that the pool basis is being maintained, though the old rumor keeps cropping up that this is being shaded. We continue to quote Bessemer and open-hearth billets, 4 x 4 and larger, up to .25 carbon, $24; up to and including .60 carbon, $1 extra; over .60 carbon, $2 extra. Axle and forging billets, smaller than 4 x 4, $25, Chicago. Open-hearth billets from store, $1.30 per 100 lbs.

Iron and Steel Bars.—The week has been an active one in point of specifications for iron and steel bars. Little new business is being placed, the majority of the consuming interests having placed contracts for their entire year's requirements some months ago. Railroads are taking iron more freely than they have in some months, and a gradual improvement in this trade is expected from now on. Prices are firm, carload lots, mill shipments, Chicago delivery, being quoted as follows: Bar iron, 1.45c, full extras; soft steel bars, 1.51½c, half extras; with 5c to 10c per 100 pounds extra for less than a carload and with the regular extras for less than a ton of a size; angles, less than 3 x 3, 1.56½c base, half extras; noops, 1.56½c, full extras. On lots from store, we quote iron bars, 1.65c to 1.75c; steel, 1.70c to 1.80c base, half extras; hoops, 2c, full extras.

Sheets.—A comparatively good trade was closed last week for both black and galvanized sheets, and some interests have withdrawn from the market. Pool prices on both products are still being cut, though not to the same extent as formerly, the chief cutters having secured all the business of this kind they can handle and now declining further offers. The jobbing trade is reported quite active. On mill shipments, Chicago delivery, for one pass, cold rolled sheets, we quote scheduled prices as follows: Nos. 16 and 17, 2.16½c; Nos. 18 and 21, 2.21½c; Nos. 22 and 24, 2.26½c; Nos. 25 and 26, 2.31½c; No. 27, 2.36½c; No. 28, 2.46½c; No. 29, 2.76½c; No. 30, 2.86½c. Galvanized sheets, carload lots, mill shipment, Chicago delivery: Nos. 16 and 17, 2.56½c; Nos. 18 and 21, 2.71½c; Nos. 22 and 24, 2.86½c; Nos. 25 and 26, 3.06½c; No. 27, 3.26½c; No. 28, 3.46½c; No. 29, 3.86½c; No. 30, 4.26½c. On small lots from store, we quote black sheets as follows: Nos. 8 and 10, 2.15c to 2.20c; No. 12, 2.20c to 2.25c; No. 14, 2.30c to 2.35c; No. 16, 2.40c to 2.45c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.65c to 2.70c; No. 27, 2.75c to 2.80c; No. 28, 2.80c to 2.85c; No. 29, 2.95c to 3c; No. 30, 3.10c to 3.25c. Galvanized, 75 and 7½ percent on gauges 16 and heavier and 75 and 10 percent on gauges 18 and higher.

Structural Steel.—A fair demand keeps up for small lots, the aggregate of which makes a respectable tonnage. Prices are strong, and we quote: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 2c; 18, 20 and 24-inch, 10c extra; tees, 2.05c rates.

Plates.—The movement from warehouse stocks is brisk and specifications from jobbers are increasing. With few exceptions, however, direct shipments from mill are quiet. Reports are frequently made that on some sizes of plates slight concessions from pool prices are being made. We continue to quote association prices on carload lots, mill shipments, Chicago delivery: Tank steel, ¼-inch and heavier, 1.76½c; flange steel, 1.86½c; marine, 1.96½c; universal mill plate, 1.76½c to 1.81½c; 3-16-inch tank, 1.86½c; Nos. 7 and 8, 1.91½c; No. 9, 2.01½c; No. 10, 1.91½c; No. 11, 1.96½c; No. 12, 2.01½c. From store, we quote tank steel, ¼ inch and heavier, 2c; 3-16, 2.15c; No. 8, 2.20c; No. 10, 2.25c; flange steel, 2.25c to 2.35c, all f. o. b. warehouse.

Rails and Track Supplies.—One or two small transactions in heavy rails were closed during the week, but new business in both heavy and light sections is notably dull. Track supplies are also light, though shipments on old contracts are heavy. Prices are unchanged, and we quote heavy rails, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $24 to $28, with regular differentials for intermediate sizes. The following quotations on track supplies, which are f. o. b. Joliet mill, may be shaded on large orders. Angle bars, 1.40c to 1.50c; spikes, first quality, 1.70c to 1.80c (out of store, 1.90c rates); track bolts, 3½ x ¾, with square nuts, 2.40c to 2.50c per 100 pounds; with hexagon nuts, 2.55c to 2.65c, with usual differentials for other sizes.

Merchant Steel.—Each week sees some new contracts closed for deliveries commencing with next July, and in some instances extending to July, 1905. Specifications on old orders have declined with the advance of the dull season, though, as yet it has had no marked impression on the output of mills. Prices are firm and we quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 2c; sleigh shoe, flat sizes, 1.56½c; concave and convex, 1.76½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.76½c base; smooth finished tire, 1.71½c; plow steel, 2.30c and upward, according to quality; toe calk, 2.06½c base. Ordinary grades of crucible tool steel, 6½ to 8c; special tool steel, 12c and up. Cold rolled shafting, 52 percent from list in carload lots, and 47 percent discount in less than car lots.

Merchant Pipe.—Mills report there is a good demand, considering the dullness in other branches of the trade. Prices are firm and without change, and we quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guar. Wrought Iron. Black. Percent.	Guar. Wrought Iron. Galv. Percent.
⅛ to ¾ inch	66.35	56.35	64.35	54.35
½ inch	69.35	59.35	67.35	57.35
¾ to 6 inches	73.35	63.35	71.35	61.35
7 to 12 inches	69.35	59.35	66.35	56.35

Less than carloads, 1½ per cent. advance.

Boiler Tubes.—Some slight improvement is discernible over conditions existing a few weeks back, but both demand and prices are still weak. We quote carload lots, mill shipments, as follows:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	43.35	40.35	52.35
1¼ to 2¼ inch	55.55	33.35	40.35
2½ inch	58.35	43.35	48.35
2¾ inch to 3 inch	64.35	50.35	Up to 4 inches. 56.35
3½ to 12 inch	55.55	33.35	

For car lots or less direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	40	25	37.50
1¼ to 2¼ inch	50	32.50	35
2¾ to 5 inch	50	45	Up to 4 inches. 45
6 to 12 inch	50	32.50	

Wire Products.—The dull season for wire products is on, and producers do not expect a heavy trade for the next few weeks. Specifications are coming in quite freely and there is a good movement against old contracts in all lines. Prices are firm and unchanged. We quote to jobbers, carload lots, as follows: Wire nails, carload lots, $2.10; less than carload lots, $2.15; cut nails, carload lots, 1.91½c base; less than carload lots, 1.96½c; smooth wire, carloads, $2, and $2.05 for less than carload lots; galvanized smooth wire, $2.30 in carloads, and $2.35 in lesser amounts; painted barb wire, $2.40 carloads, and $2.45 in less than carload lots; galvanized barbed wire, $2.70 carloads, and $2.75 less than carload lots. Staples, polished, carloads, $2.25; less than carload lots, $2.30; galvanized, $2.55 carloads and $2.60 less than carload lots. Bale ties, 82½ and 5 percent discount, f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or De Kalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—So long as the tonnage of coke on track keeps up to present proportions dealers expect the market will continue in its present demoralized state. Sales are not being made these days with the intention of making a profit, but rather with the hope of escaping a loss. Some transactions were closed last week at slightly above the freight rate, though these are extreme cases. The market, however, is just what the buyer wants to pay for the coke, and so long as it is half-way reasonable, he can get almost any quantity he wishes at that price. On contracts, for future deliveries, Connellsville producers are holding out for $2 to $2.50 at the ovens, though it may be stated that there is little, if any, of this kind of trading being done. West Virginia and other Southern grades are sold at a variety of prices, ranging from $4.50 upwards.

Old Material.—There is little movement apparent in the scrap market. Prices are weak and concessions are being freely offered to induce buying. We quote prices that have been paid by dealers on recent transactions, per gross ton, as follows:

Old iron rails	15 50 to 16 50
Old steel rails (mixed lengths)	9 25 to 9 75
Old steel rails (long lengths)	11 50 to 12 00
Relaying rails	23 00 to 24 00
Old wheels	12 00 to 12 50
Heavy melting steel	10 00 to 10 50
Mixed country steel	7 50 to 8 00

The following quotations are for net tons:

Low phosphorus scrap (.04 and under)	$12 00 to 13 00
No. 1 R. R. wrought	11 50 to 12 00
No. 2 R. R. wrought	10 50 to 11 00
Shafting	13 50 to 14 00
Dealers' forge No. 1.	9 25 to 9 75
No. 1 cast	11 50 to 12 00
No. 1 busheling and wrought pipe	9 00 to 9 50
Heavy cast (300 pounds and over)	8 50 to 9 25
Agricultural malleable	9 00 to 9 50
Iron axles	16 50 to 17 00
Steel axles	14 50 to 15 00
No. 1 boilers, cut	8 50 to 9 00
Boiler Punchings	9 00 to 9 50
Cast borings	4 25 to 4 75
Mixed borings, etc.	4 25 to 4 75
Wrought turnings	7 00 to 7 50
Machine shop turnings	7 00 to 7 50
Iron axle turnings	8 00 to 8 50
Steel axle turnings	8 00 to 8 50
Stove plate and light cast scrap	9 00 to 9 50
Old iron splice bars	13 50 to 14 00

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, May 17.

Ore sellers, who have tried to find the amount of ore available for furnaces in territory tributary to Lake Superior have figures which show a total of about 11,000,000 tons. This covers the situation as of May 1. Of this total 4,500,000 tons is on Lake Erie docks and about 6,500,000 tons in all furnace yards, including those of the U. S. Steel Corporation, as well as ore stocks at Lake Erie furnaces. The amount computed to be on hand is about a five months supply at the present rate of consumption.

The lake ore situation is not strong. No sales have been reported lately but consumers are usually backward about buying, and the reason is well understood, in view of the open ore market. The producers of Bessemer and basic iron are actuated by caution growing out of the narrow market for their product at present and the foundry pig iron producer, by a fear that later developments in the iron ore market may give a competitor an advantage as to price. The first cargo of ore was shipped from the head of Lake Superior early this week. No general movement is yet contemplated or possible. The situation does not warrant the belief there will be any movement of ore very soon. The strike of the masters and pilots of the lakes seems more than ever the beginning of a determined contest, since negotiations looking to a settlement of the difficulty have been abandoned. The Lake Carriers' Association holds a meeting on Thursday, meanwhile its members are signing an agreement not to employ captains and mates through the Masters' and Pilots' Association.

Pig Iron.—The market is still a waiting one. The foundries are buying simply for present wants. Transactions for May and June are limited both by the amount of iron yet to be disposed of and by the needs of the consumers. Very little has been done for delivery after July 1 while lately practically nothing has been sold for this delivery. Consumers do not want to buy at current prices for second half delivery and producers are not ready to make new prices until they know how low they can get their ores. Bessemer and basic are hardly quotable commodities just now. Coke is very easy, the supply being almost superabundant, while prices are steady because they are considered bottom. We quote pig iron prices as follows for Cleveland delivery, except Northern gray forge which is quoted as at Valley furnace.

Bessemer	$13 60 to 13 85
No. 1 Strong Foundry	13 85 to 14 00
No. 2 Strong Foundry	13 25 to 13 50
No. 3 Foundry	12 40 to 12 75
No. 2 Southern	13 60 to 13 85
Gray Forge, Valley furnace	12 15 to 12 40
Gray Forge, Southern	13 00 to 13 10
Lake Superior charcoal	14 35 to 14 50

Finished Material.—It is evident that competition is very strong on most products. The buying is for current use almost altogether inquiries and specifications coming simultaneously with demand for prompt delivery. The mills are kept fairly well supplied with orders, but the increased production of the past year has been a very important factor in the situation, causing much of the weakness that now exists. Billet capacity is greater than the demand and billets have been sold under the market by some of the independent producers and have gone off $1 to $2 a ton in this market. Sheets are being shaded by spells, the smaller mills cutting the price, until they are satisfied, and then retiring from the market. The prices on material sold through jobbers remain about as follows: Mill sales for black sheets No. 10, 1.75c; No. 11-12, 1.80c; No. 14, 1.85c; No. 16, 1.95c; No. 27, 2.20c; No. 28, 2.30c. Galvanized 80 and 3 off list. The prices which rule on material out of stock are as follows: No. 10, 2.10c; No. 12, 2.15c; No. 14, 2.20c; No. 16, 2.30c; No. 18-20, 2.40c; No. 24, 2.45c; No. 25-26, 2.50c; No. 27, 2.55c; No. 28, 2.65c; No. 30, 3.10c. Galvanized sheets out of stock 75, 10 and 5 off list for No. 16-20 and 75, 10 and 7½ off list for No. 22 and lighter.

Old Material.—There is great lack of demand. Those having material which must be sold for lack of storage room and who take what the market will afford, turn over their scrap at a sacrifice. There seems to be little buying power and for the time being low prices are named. We quote as follows, for all gross tons, Cleveland:

Old iron rails	$16 00 to 17 00
Old steel rails (over 6 feet)	12 00 to 13 00
Old steel rails (over 6 feet)	11 00 to 12 00
Old car wheels	11 50 to 12 00
Steel boiler plate	10 00 to 11 00
Malleable iron (railroad)	10 00 to 11 00
Malleable iron (agricultural)	9 00 to 10 00
Heavy steel	10 00 to 11 00

We quote the following net tons:

No. 1 R. R. wrought	$11 00 to 12 00
No. 1 busheling	9 50 to 10 00
No. 1 machine cast	10 00 to 11 00
Iron axles	16 50 to 17 50
Axle turnings	8 00 to 9 00
Wrought turnings (free from cast)	7 00 to 7 50
Grate bars	7 00 to 8 00
Pipes and flues	9 00 to 10 00
Tank iron	7 50 to 8 50
Hoop and band iron	5 00 to 5 50
Sheet iron	4 00 to 5 00
Wrought drillings	7 00 to 7 50
Stove plate	7 50 to 8 50
Steel axles	13 00 to 14 00
Cast borings	4 00 to 4 50

CINCINNATI.

May 17.

The coke market continues quiet and easy. The best brands are still quoted at $2 to $2.15 f. o. b. Connellsville for foundry coke. Some coke is available as low as $1.75 f. o. b. ovens.

Pig Iron.—The tone of the market is easy and a further reduction in prices is noted. The open quotation for No. 2 foundry is now $9.50 Birmingham, and it would not correctly represent market conditions to omit the observation that this figure could be shaded. There is hardly enough demand to test the market for minimum prices. Some iron purchased at Dayton, O., during the week furnishes the example of what sellers are ready to do under present conditions on attractive business. There was 1,000 tons in the order, divided as follows: 300 tons Northern No. 2, which went at $12 Ohio furnace; 300 tons Northern No. 3, which sold at $11.80 Ohio furnace; 300 tons Southern No. 2 foundry at a shade under $9.50 Birmingham; 100 tons charcoal iron at $13.50 Birmingham. Several quotations at $9.50 Birmingham on the Southern No. 2 were made, showing that Southern producers are not inclined now to hold up prices, and are willing to sell iron at competitive figures. The transaction was the only sale during the week to attract attention and was freely commented upon by the trade as furnishing an index to the situation. There are a number of quotations out on inquiries for prices on analysis and it is not too much to say that some of these quotations are equal to $9.25 Birmingham for No. 2 foundry. The weakness in the market, however, seems to be confined to the higher grades, as gray forge and No. 4 foundry are still scarce and in good demand. These grades and No. 3 foundry are coming closer together in price each week. Gray forge and No. 4 foundry are a ready sale at $8.75 Birmingham, which is the lowest quotation heard, while Southern No. 3 is openly quoted at $9 Birmingham. The scarcity of gray forge is something of a feature and it is reported from Birmingham that one furnace interest actually tried to make some forge ship out on orders.

All the news of the week, with the exception of some statistical information has been against the market. Reports from consuming centers are not encouraging and considerable dullness is noted in some lines. The attitude of Northern furnaces in the Ironton district in the light of the developments of the week is not quite clear, but it is presumed that the prices made by the Northern Ohio interests will be met. Furnace costs are coming in for a share in a discussion of the general situation and are held up to view as marking a stopping point in the declining tendency. Buyers are staying out of the market for their third quarter requirements and are not expected to show much interest until June. It is not clear what sort of buying will then come out or what amount of tonnage will be wanted for the third quarter. There are those who believe that there will be enough buying in June to strengthen the situation in the same way that the market

has responded to the buying and inquiry incident to the previous quarterly periods.

Current prices f. o. b. Cincinnati are:

Southern Foundry No. 1	$12 75 to 13 00
Southern Foundry No. 2	12 25 to 12 50
Southern Foundry No. 3	11 75 to 12 00
Southern Foundry No. 4	11 50 to 11 75
Southern Foundry No. 1 soft	12 75 to 13 00
Southern Foundry No. 2 soft	12 25 to 12 50
Gray Forge	11 50 to 11 75
Northern Foundry No. 1	13 90 to 14 15
Northern Foundry No. 1	13 90 to 14 15
Northern Foundry No. 2	13 40 to 13 65
Southern car wheel iron	16 25 to 16 50

Finished Material.—There is no change in the market and trade is quiet. No new prices have been reported. There seems to be no pressure to sell on the part of jobbers or mills and at the same time the demand is light. Bar iron is quoted at 1.45c f. o. b. Steel bars, 1.48c base, half extras, with dealers quoting 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 to 75, 5 and 2½ percent off. We quote black sheets, No. 27, at 2.45c in car lots of 500 bundles. Black sheets out of store are selling as follows: No 28, 2.80c; No. 27, 2.70c; No. 16, 2.35c; No. 14, 2.30c; No. 12, 2.35c; No. 10, 2.20c. Tank plates are dull and sell out of store at 2c for ¼-inch and 2.10c for 3-16 inch. Beams and channels are quoted at 2c from stock and angles at 1.90c to 2c for base sizes.

In merchant pipe there is nothing new to note and the market is steady. There is some improvement in the volume of orders but not to an important extent. Prices are well maintained. Car load lots f. o. b. Cincinnati are quoted as follows:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	64.7	54.7
½ inch	69.7	59.7	67.7	57.7
¾ to 6 inch, inclusive	73.7	63.7	71.7	61.7
7 to 12 inch, inclusive	69.7	59.7	66.7	56.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 12 inch	54.2	36.7

Old Material.—Dealers report but little demand from melters of scrap and rather free offerings. Railroads are submitting good lists of material for bids. The tone of the market is easy. We quote selling prices to melters as follows:

Old No. 1 railroad wrought, net tons	$11 50 to 12 00
Cast machine and foundry, net tons	11 50 to 12 00
Old iron rails, gross tons	14 50 to 15 00
Old steel rails, gross tons	11 00 to 11 50
Old short lengths, gross tons	11 00 to 11 50
Old iron axles, net tons	15 00 to 15 50
Stove plate, net tons	8 00 to 8 50
Wrought turnings, net tons	8 00 to 8 50
Cast borings, net tons	5 00 to 6 00

NEW YORK.

OFFICE OF *The Iron Trade Review.*
ROOM 1315, NO. 150 NASSAU ST., May 17.

Pig Iron.—Developments of an unfavorable character have come during the past week. The dullness noted last week was accentuated and prices, especially for Southern brands, showed a decided tendency to recede. The Southern situation shows marked weakening. One large interest, whose prices are generally well maintained notified its representatives during the week to book orders for No. 2 foundry at $9.75 Birmingham, for delivery up to September 1. Other furnaces are making sales for this delivery at $9.50, and there is excellent reason for believing that on a good proposition $9.25 can be done. No one holds out any bright prospect for the third quarter. In Northern irons transactions have decreased in volume, and prices do not show much stability. The situation is one from which consumers alone can get any satisfaction. Trading in pig iron warrants on the Metal Exchange continues nominal, with Southern No. 2 foundry quoted at $9.37½ up to September delivery. New York prices for pig iron at tidewater are as follows: Northern No. 1 X, $15.25 to $15.50; No. 2 X, $14.75 to $15; No. 2 plain, $14.25 to $14.50; Southern No. 1 foundry, $13.50 to $14; No. 2 foundry $13 to $13.50; No. 3 foundry, 12.50 to $13; and No. 4 foundry, $12 to $12.50.

Rails.—The market became a little more animated during the week. The Lackawanna Steel Co. took contracts aggregating 20,000 tons. Standard sections are $28 at mill.

Finished Irons and Steel.—The finished material situation is without a single feature of interest. In structural shapes there are many propositions that seem to be far away from closing with each week. In some cases bids have been submitted on the same job several times, and this practice has become so common that many mills are now dealing direct with principals, instead of through agents. Some very low figures are submitted. In Greater New York alone an official of the leading interest estimates the tonnage in sight to be about 70,000 tons, of which he estimates that one-half will probably not be placed until next year for one reason or another. Plates show no improvement, the demand continuing very light. In sheets and bars buying on a small scale and for nearby requirements is the rule. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.35c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84½c to 1.90c; firebox, ordinary, 1.94½c to 2c; refined iron bars, 1.50c to 1.55c; soft steel bars, 1.50c to 1.55c; steel sheets, in carloads, New York, No. 28 black, 2.45c to 2.50c; galvanized, 3.45c to 3.50c.

BIRMINGHAM, ALA.

BIRMINGHAM, ALA., May 16.—The Southern pig iron market is showing signs of weakening and prices have given way somewhat. No. 2 foundry iron has sold at $9.50. The furnace companies in this section, however, are reported not to be hurrying into the market to sell their product at the $9.50 rate and believe that in a short time the decline will halt. The shipments of iron, steel, cast iron pipe and kindred products, while not as brisk as during March and the first part of April, are still fairly good, according to reports of railroad officials. The Southern Iron Committee, composed of railroads handling the products of Southern furnaces, pipe works, steel plants, etc., held a meeting here this week, but only routine business was transacted. It was announced that the manufacturers did not have any request to make of the committee, hence there would hardly be any changes in the freight rates. The production in Alabama of iron, steel and other products is holding up well, the furnaces in blast doing well.

Sales agents for the Sloss-Sheffield Steel & Iron Co. have been in Birmingham for the past few days conferring with the general officers of the company in regard to market conditions and prospects. The Sloss-Sheffield company is in the market again, but Vice President McQueen states that there is no anxiety to book business at prevailing prices. He intimates that there will be an improvement in the near future.

Inquiries being received here for iron still intimate that there will be dull times in iron until the elections are over in November.

F. E. Mesta, who has been general manager of the Dimmick Pipe Co. at North Birmingham for some time, has tendered his resignation. It is understood that Mr. Mesta will not leave the Birmingham district but may be at the head of an organization using pig iron in its daily operation. The pipe industry is still very active hereabouts and promises to continue so for some time to come. The position of general manager of the Dimmick plant will be abolished and President F. D. Dimmick will look after these interests personally. John Bowron, who has been in the Philadelphia and Pittsburg offices with the Dimmicks, will come to the Birmingham district and go with the pipe plant.

The Bessemer rolling mills, belonging to the Tennessee Coal, Iron & Railroad Co., are idle, in consequence of labor trouble there over the tonnage question. The Gate City rolling mills, belonging to the Republic Iron & Steel Co., are the

only mills in operation in the immediate Birmingham district.

There is much activity in the steel plant at Ensley, belonging to the Tennessee company, and the steel rod, wire and nail mills, belonging to the Alabama Steel & Wire Co.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, NO. 150 NASSAU ST., May 17.

Pig Tin.—Although prices show only a slight decline from those quoted in our last report, the undertone augurs for lower prices according to trade authorities. Demand from consuming sources is very slow and business in consequence is dull. In London the market has been quiet, with quotations showing increased weakness especially for futures. Closing prices today at the Metal Exchange follow: Spot, 27.60c to 27.90c; May, 27.50c to 27.80c; June, 27.30c to 27.60c. London's closings today follow: Spot, £124 17s 6d; futures, £124 7s 6d. Arrivals at Atlantic ports for the month to date amount to 1,685 tons, with 3,329 tons afloat.

Copper.—The "official" prices—those at which leading producers will sell—were reduced ⅛c yesterday on all grades. This is in sympathy with general trade conditions, which are far from being satisfactory, buying being limited, and only for immediate wants. In London the market developed further weakness, with buying for export the sole redeeming feature in that and this market. Closing prices at the Metal Exchange today follow: Lake, 13¼c to 13½c; electrolytic, 13⅛c to 13¼c; casting, 12⅞c to 13⅛c. London's closings today follow: Spot and futures, £57. Exports for the month to date aggregate 6,235 tons, against 4,127 tons for a corresponding period last year.

Lead.—Is quiet and unchanged with spot at 4.60c to 4.65c. St. Louis and London are still quoted at 5.00c, and £11 17s 6d, respectively.

Spelter.—Prices are unchanged with 5.20c to 5.25c for spot. St. Louis is selling at 5.00c, and London is easier at £22 2s 6d.

Antimony.—All grades are lower, Cookson's being 7¼c sellers, Hallet's at 7.00c to 7.50c, and other brands at 6.25 to 6.50c.

Quicksilver.—We quote $45 per flask of 76½ pounds in lots of 100 flasks. London is £8 2s 6d.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, May 17.

Transactions in metals during the past week limited to routine business. Generally speaking, the market is quiet. Small lot purchases are the rule, melters not caring to cover beyond a month's requirements. Pig tin is weak and has declined half a cent. Other metals are without material change. We quote Lake copper, 13½c for carloads, and 13¾c for smaller lots. Casting, 13¼c for carloads, and 13¾c for smaller lots. Pig tin, 29c to 29½c, according to quantity. Spelter, 5⅛c, carloads, and 5¼c to 5½c for less than carload lots. Sheet zinc, 5.75c per lb. in car lots of 600-lb. casks, and 5.95c to 6c for less than carload lots. Pig lead, 4.45c, in carloads, and 4.50c to 4.55c in lesser amounts. Antimony, 8½c to 8¾c for Cookson's, and 7¼c to 7½c for Hallett's. Nickel, 45c to 60c, according to quantity.

The demand for old metal is quiet, in sympathy with the new product. Prices on some materials have declined fractionally. We quote as follows: Copper wire and heavy, 11¼c; copper bottoms, 10c; copper clips, 11c; red brass, 10c; yellow brass (heavy), 7¾c; yellow brass borings, 6¼c; red brass borings, 8c; light brass, 5½c; pipe lead, 4c; teal lead, 3.90c.

The Gray Ore Iron Co., of Birmingham, Ala., has just voted an issue of $100,000 bonds for the development of its ore property in Talladega county, Ala. It is expected that half the proceeds of the issue will be utilized in the near future.

LAKE SUPERIOR IRON MINES.

At no point in the Lake Superior region is there more activity just now than at the Glen, Monroe and Howard mines of the Oliver Iron Mining Co. in the Hibbing district, Mesabi range. The Glen is probably the best opened mine on the Mesabi range—that is, it is most splendidly equipped and arranged for the work it has to do, and the rather unfavorable conditions there have been well met. This mine has accumulated a stock pile of 140,000 tons of ore since last fall out of one shaft, with but a small force at work, and this is evidence enough that the mine is well managed. It is to be an important shipper the present year. At the Monroe are 160 acres of land, three forties north and south and one west of the center forty of land. A large part of these is ore. Three shafts are now going down, placed east and west across the northern part of the center 40 acres. The easterly is shaft A and is now at a depth of 170 feet, 60 feet of which is in ore of excellent quality. This shaft is to rest at about 200 feet, for the present. Shaft B is down 90 feet and still in surface, and C is 160 feet and in ore. The company started three shafts last fall but but had great trouble with quicksands, and has not made the progress desired on that account. A stripping contract of 2,000,000 cubic yards is under way by the Killorin-Philbin Co. and about 160,000 yards have been removed since the shovels started. One shovel was worked most of the winter, in spite of the severe weather. This contract is one of the largest that has ever been given on the Mesabi in a single deal. The scope of stripping here is interesting, as it indicates the difference of opinion now and a few years ago as to depths. The averages of surface on the Monroe are from 80 to 100 feet, and much ground that will probably be taken off later is at least 120 feet thick. But there is abundant ore below to warrant this outlay. The stripping will cover about 20 acres for the present. The mine will be equipped with electric underground tramming, and ore will be drawn north to the shafts from the south line of the property, beneath the stripping, which latter is for mining by the milling process. Drills have been steadily operated on the mine since its purchase last fall by the United States Steel Corporation, and it is understood that a number of the old holes have been redrilled, ore having been found at a greater depth, and in large quantity, so that the tonnage upon which the mine was sold has been magnificently increased. Both this mine and the Howard were the property of the Chemung Iron Co. of which the late Henry W. Oliver and Chester A. Congdon, of Duluth, were owners. At the Howard one shaft is going down and is now in ore. This is a large property. Neither of these mines can ship this year, but both both will be exceedingly important mines in time.

Susquehanna mine of the Buffalo & Susquehanna Iron Co., of Buffalo, has been closed indefinitely, and the company will make no attempt to produce anything this year. Two shafts

The Mansfield mine, near Crystal Falls, Menominee range, has closed indefinitely, throwing out all but 12 men. The mine was in the midst of certain development work, including the sinking of the main shaft, and this is stopped with the cessation of mining. The mine will probably ship but little of its stock pile this year. It is a Menominee Bessemer property and belongs to the Oliver Iron Mining Co.

Traders mine, near Iron Mountain, Mich., has resumed and may continue for some time. It produces a lean silicious ore that is good for a mixture. Nearly 100 men have been put to work.

The Crystal Falls properties of Corrigan, McKinney & Co. have commenced shipments of ore to Escanaba, and are now sending out their daily hoist.

American Foundrymen's Association.

Dr. Richard Moldenke, secretary of the American Foundrymen's Association, announces that the Hotel Claypool, Indianapolis, will be headquarters for the annual convention of the association on June 7, 8 and 9. Twenty papers are promised for the meeting, covering a wide range of subjects. The members of the association are urged, in addition to attending themselves, to send their superintendents, pattern shop and other foremen, as well as accountants, as subjects interesting to all will be discussed.

THE JOINT MEETING OF MECHANICAL ENGINEERS.

The joint meeting of the American Society of Mechanical Engineers and the Institution of Mechanical Engineers at Chicago will commence on May 31 and terminate June 3. The headquarters will be established at the Auditorium Hotel. The opening session on Tuesday evening, May 31, will be held in the Music Hall of the Fine Arts building when Mayor Carter H. Harrison will extend a welcome on behalf of the city and acknowledgment will be made by Mr. Ambrose Swasey, president of the American Society of Mechanical Engineers, and Mr. J. Hartley Wicksteed, president of the Institution of Mechanical Engineers. After the meeting an informal reception will be held for the members, visitors and ladies in the main parlors of the Auditorium Hotel.

The second session will be held on the morning of June 1 in the Auditorium Hotel. This will be a business session for the reports of tellers and committees, etc. The presentation of professional papers will then take place as follows: "The Wage Problem," by Harrington Emerson; "Some Recent Examples of Destructors for Town Refuse," by George Watson, and "Refuse Destruction by Burning and the Utilization of Heat Generated," by Russell C. Newton. At the close of the session luncheon will be served. Wednesday afternoon the members and guests will visit the South Chicago Works of the Illinois Steel Co.

The third session, Wednesday evening, will be held in the Music Hall of the Fine Arts building. The following papers will be presented: "Some Theoretical and Practical Considerations in Steam Turbine Work," by F. Hodgkinson; "The De Laval Steam Turbine," by E. S. Lea and E. Meden; "The Curtis Steam Turbine," by W. L. R. Emmet; "Different Applications of Steam Turbines," by A. Rateau, and "The Potential Efficiency of Prime Movers," by C. V. Kerr.

The fourth session on Thursday morning will be held in the Auditorium Hotel. The following papers will be presented: "Power Plant of the Tall Office Building," by J. H. Wells; "Power Plant of Tall Office Buildings," by R. P. Bolton; "Middlesborough Dock Electric and Hydraulic Power Plant," by Vincent L. Raven; "Use of Superheated Steam and of Reheaters in Compound Engines of Large Size," by Lionel S. Marks, and "Commercial Gas Engine Testing and Proposed Standard of Comparison," by Wm. P. Flint.

Excursions will be made on Thursday afternoon to the Fisk street station of the Commonwealth Electric Co., as guests of the Chicago Edison Co., and to the Stock Yards and Packing Houses as guests of Swift & Co.

On Thursday evening the local members of the American Society of Mechanical Engineers will tender a reception to the officers and members of the two societies and the ladies at the Art Institute.

The closing session, Friday morning, will take place at the Lewis Institute with the following list of papers: "Cast Iron Composition, Strength and Specifications," by Wm. J. Keep; "The Effects of Strain and of Annealing," by Wm. Campbell; "Experiments with a Lathe Tool Dynamometer," by J. T. Nicolson; "Road Tests of Consolidation Freight Locomotives," by E. A. Hitchcock; "Locomotive Testing Plants," by W. F. M. Goss, and "Notes on Testing Locomotives," by various engineers. At the close of the session the members and ladies will be the guests of the Lewis Institute at luncheon. Friday afternoon is open to excursions to the Clearing Yards of the Union Transfer Railway Co., the Drainage Canal and the Fisk street station as guests respectively of the Chicago Union Transfer Railway Co., of the Western Society of Engineers and of the Chicago Edison Co. The local members have invited the visitors to a special concert by the Thomas Orchestra in the Auditorium Theatre on Friday evening.

The members of the Institution of Mechanical Engineers purpose starting from Chicago after the entertainment on the evening of Friday, June 3, taking the night trains for St. Louis. The American Society of Mechanical Engineers has already headquarters in the Palace of Machinery and the visiting members will have every privilege at the disposal of their engineering hosts. Col. C. M. Watson, Commissioner-General for Great Britain at St. Louis, will give the Institution an afternoon reception in the British Royal Pavillion. This will probably take place on Monday, June 6. The visit to St. Louis will continue to June 9 according to the program. An invitation to stop over in Cincinnati has been extended from the Engineers of Cincinnati, through Mr. H. M. Lane, of the Lane & Bodley Co. A reception will be held on the morning of June 10 after the night trip from St. Louis. A visit is planned to the local works and later there will be a social entertainment. The particulars of the visit to Cincinnati will, however, be perfected at the Chicago meeting. Mr. Ira N. Hollis, Chairman of the Division of Engineering at Harvard University, has invited the members of the Institute of Mechanical Engineers to Boston. The President and Mrs. Wicksteed have accepted the invitation for June 20 and 21 and there will probably be sufficient members for a program of reception by the local members of the A. S. M. E. and the Boston Society of Civil Engineers. The arrangements will be completed at the forthcoming convention. The president of the American Society of Mechanical Engineers, Mr. Ambrose Swasey, will welcome the members of the Council of the Institution of Mechanical Engineers with their ladies at dinner in New York on May 23.

President Hearne on the Situation.

(Special Telegram.)

PITTSBURG, May 18.—Col. Frank J. Hearne, president of the Colorado Fuel & Iron Co., arrived in this city yesterday and will visit his former home at Wheeling before returning again to Denver. In speaking of the outlook in the iron trade he said: "The outlook for more prosperous business in the immediate future is not encouraging. This state of affairs is due to many causes. Naturally the presidential election is holding back some business, but the railroads are not showing a tendency to buy heavily and this greatly affects the steel industry. The car companies, for example, are very short of orders." Mr. Hearne believes that business in the West is much better than in the East, as in the latter section of the country many people lost heavily from stock shrinkage from which they have not yet recovered, while in the West, the slump in the market only hurt a comparative few. In speaking of the coal strike, he said that the output of the Colorado company's mines is almost normal again, while the coke output will soon again be at its maximum.

Personal.

C. J. Morse has resigned as secretary and treasurer of the Orient Coke Co., of Pittsburg, and has been succeeded by Reid Kennedy, of Homestead, Pa.

George J. Bryen, master mechanic of the Duquesne plant of the Carnegie Steel Co., Pittsburg, sailed this week for Europe on a three months' vacation tour, the expense of which will be borne by the company in recognition of his services over a period of 25 years.

Judge George Gray, of Delaware, is prominently mentioned as the successor of the late Senator M. A. Hanna as president of the National Civic Federation.

E. P. Breckenridge, first vice president of the Colburn Machine Tool Co., of Franklin, Pa., was shot and seriously wounded by a burglar who entered his home last week. While the wound is dangerous it is not necessary fatal.

J. C. McQuiston, until recently secretary, has been appointed superintendent of the Westinghouse companies' publishing department, having charge of matters relating to the publicity of the products of the various Westinghouse interests in the United States and Canada.

The Grinding Machinery Co., 23 South Canal street, Chicago, has been organized to do a business exclusively in grinding machinery. Robert Tarrant Sr., is president, and Robert Tarrant Jr., secretary and treasurer, while Clyde W. Blakeslee, for many years connected with the Northampton Emery Wheel Co., is vice president. The company carries a large stock of grinding machinery and its line includes the best known machines for the various classes of work to which grinding machinery is put. The organization is unique in that it is the only concern which aims to carry in stock grinding machines and tools for all classes of work, and to emphasize this fact, the company has adopted as its trade mark, "Everything Known in Grinding."

A NARROW GAUGE ROAD FOR QUARRY WORK.

The use of narrow gauge railways in connection with various manufacturing, mining, building and contracting operations has developed the construction of such railways into an industry of no small importance. Arthur Koppel, 66-68 Broad street, New York, whose industrial railway systems have come into use for widely varying forms of service, has equipped the complete railway for a quarry connected with a cement works, as shown in the accompanying illustration.

This railway consists of 25-pound rails spiked down to

FIG. 1.—SHOWING TEMPORARY TRACK IN QUARRY AND CARS IN POSITION FOR LOADING

wooden ties for the permanent road, and 16-pound portable track for use in transporting the rock as quarried to the permanent road. The portable track is made in sections, each weighing about 250 pounds, and mounted on steel ties, so that it can easily be laid, without any previous preparation of the ground. No excavation is necessary and the track sections can readily be moved from place to place as required. Eight switches for use with this portable track were also furnished. These are made as standard in two different lengths—9 feet and 15 feet—to match the track, and for 12 feet radius as well as for a radius of about 30 feet.

There were also furnished 30 standard steel side dump cars, dumping to both sides, each with a capacity of 1½ yards. These were fitted with the Koppel patent roller bearings, which it is stated effect a saving of nearly 50 percent in haulage power over cars fitted with ordinary axle boxes. These bearings while practically dust and dirt proof, can readily be cleaned if necessary. There is also a considerable reduction in consumption of oil, only sufficient being put into the bearings to prevent the rollers from rusting. All this material was for a standard narrow guage railway of 23⅝ inches.

The question of handling material in connection with large excavating, mining and quarrying operations has been given much study in recent years and the value of systems that handle the material most quickly and economically is coming to be more and more appreciated.

Three distinguished representatives of the Chinese government, V. K. Lee, Tsu King Yuan and Tse Shao Yung, have arrived in the United States to investigate the principal steel plants of the country. The Chinese government intends to build a steel plant somewhere in the interior of the Empire, the exact location not having been decided upon. The visitors stated that they want to obtain the most improved machinery and to become familiar with the most modern methods in the United States, and will also visit England. While in this country they will spend most of their time in Chicago and Pittsburg. The visitors declined to state how much China will spend for the establishment of the proposed plant, but they intimated that the amount will be very large.

PUMPS AND PUMPING MACHINERY.*

BY G. A. F. AHLBERG.

In designing a pump the most prominent feature will be pointed out, and must not be overlooked: All valves and ports should be arranged so as to obviate the possibility of air pockets at any part. The air always rises to the highest point. This important feature has often been disregarded, even among the most prominent pump builders today. The various sections of the pump should always have, as near as possible, the same area, for the reason that when the area increases or decreases the speed of the water is likewise affected, consequently a shock occurs when currents of water with different speeds meet. All bends should have an easy curve. All passages should be made round, because they create less friction and are stronger. Change of direction in the flow of water should be avoided as much as possible. Sharp corners should always be avoided, except where the current of water is desired to be split, as in centrifugal pumps with suction admission at each side of the casing. The top of suction valve box should never be on top of the pump barrel. The under side of the delivery valve seats should be level with or above the top of the pump barrel. The clearance space should be made as small as possible, the distance between suction and delivery valves and the plunger or piston, should be as small as possible, otherwise the suction power of the pump will be greatly reduced. Hand-holes and covers, for access to the volves, buckets, pistons and plungers, should always be provided for easy access for repairs and cleaning. Uniformity of metal all through each casting should be considered, to avoid shrinkage cracks. No studs should be used, wherever through bolts can be put in, as much annoyance, loss of time and also a great loss of money is caused by a stud breaking, as the old stud generally must be drilled out before a new one can be put in; bolts are also cheaper. This is most important in mining pumps.

Always make the valve area and water passages large enough consistent with the speed of the pump. The area of clear water way through a set of valves should not be less than 40 percent of the plunger area, for pumps having a speed of 100 feet per minute; for 150 feet it would require from 60 to 70 percent, and a piston speed of 200 feet per minute should require a valve area at least equal to the plunger area. A good common practice is to make the valve area such as to give the water a velocity of 250 feet per minute. The lift of

FIG. 2.—LOADED CARS ON PERMANENT ROAD, NARROW GAUGE RAILWAY.

the valves should be of such height as to give a full and clear passage for the water to flow through, and as to size of valves, it is better to use a number of small valves than a few large ones, on account of the smaller lift required, as it must be remembered that the water passage not only depends on the area, which increases as the square of the diameter, but also on the circumference which varies in direct proportion to the diameter. The flow of water through the valve seats is de-

*From a paper read before the Mechanical Section of the Engineers' Society of Western Pennsylvania.

pending on the area only, but the escape of the water under the valve into the chamber is depending on the circumference. The size of valves now used most commonly is between 3 and 5 inches in diameter, but some years ago certain pump builders went to such an extreme as to employ valves less than two inches in diameter for water works engines; this of course was bad judgment and was afterwards corrected. Twenty-five to fifty years ago it was a common practice to use valves 8 to 12 inches in diameter; therefore it may be said the present practice is the happy medium between the other extremes. The ordinary type of valves for ordinary and low service, say up to about 150-pound pressure per square inch, the valve disc is made of vulcanized medium hard india rubber, covered with a bronze plate and having a stem screwed in the center of the valve seat. The stemhead limits the lift of the valve and prevents the valve from drifting sidewise. The springs used should be true cylindrical in preference to conical. For higher pressure very hard and thick india rubber is used, but bronze valves are most common and most serviceable; sometimes the valves are made of steel when the nature of the liquid is such as to prevent the use of bronze. Ball valves are commonly used in deep well and tar pumps and are usually made of bronze or iron and seats in a bronze or iron ring simply by its own weight, its lift is limited by some device on the top. The valve used on the Riedler pump is mechanically operated. Only one valve of

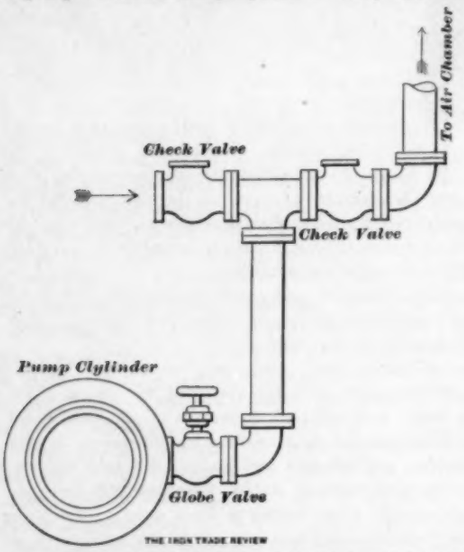


FIG. 1.—A SIMPLE AIR ARRANGEMENT FOR PUMPING ENGINES.

this type is used on each inlet and outlet of the pump, and they are mechanically closed just as the direction of motion of the pump piston is reversed. By the use of this valve large water ways are provided, and by its mechanically closing, slip and pound is prevented when the pump reverses. Rotary and centrifugal pumps can be operated without valves of any description, but it is desirable with these pumps as with all others, wihch are used for water works purposes, to use a check valve on the discharge, so that in case any accident should happen to the machinery, the reservoir, stand pipe, or other device for storing water, will not be emptied through the broken pump into the pumping station. In the case of rotary or centrifugal pumps the check valve is particularly necessary, as when the power ceases to be applied, the pump will discharge the stored water back through the pump and suction pipe into the source of supply.

In a pump not having enough valve area, the lift must be increased excessively, and then the valves will close too late and the pump commences to churn; that is a quantity of water will pass under the valves to the suction pipe, and when the pressure overtakes the valves in their downward movement, the velocity is so accelerated as to cause the valves to slam against their seats with great noise. Nothing will relieve the noise until the speed of the plunger is reduced.

Air and Vacuum Chambers.

All displacement pumps except the continuous variety, and even those, unless the continuity of the flow is perfect, should be provided with air and vacuum chambers on the discharge and suction pipes, in order to take up the irregularities of flow due to intermittent or irregular action and prevent injurious and sometimes destructive shocks. The size of air chamber depends upon the system of working, the greater the irregularities the larger the chamber should be. Therefore high speed pumps, or a pump forcing water through great lengths of pipe or against a high head, the air chamber should be enlarged, over what would be needed with slow running pumps and low lifts. For double-acting single pumps the air chamber should be from three to four times the displacement of the pump, providing the speed of the pump is moderate and the pressure under 100 pounds, but for higher speed and pressure it may have to be increased to six or eight times the size. For double acting duplex pumps the air chamber need not be more than from one-half to two-thirds of the size required for single pumps. Triplex pumps under low lifts can get along with an air chamber of capacity equal to a single displacement of the piston. The air chamber should always be placed on the highest point of the pump and it must be placed above the highest delivery opening of the pump.

For large and medium sized pumping engines, means for supplying air chambers with air should also be provided; for the largest sizes, independent air pumps are very often used, but for small pumps it can readily be accomplished by connecting a small check valve with the pump chamber, so when the pump inspires, it will draw in a small amount of air with the water; a globe valve outside of the check valve will control the amount of air if desired. Another more effective and still simple device is commonly used, consisting merely of two small check valves, a globe valve, a tee and a few fittings arranged like the sketch, Fig. 1. The check valve to the left is placed to open inwardly, and the other check valve outwardly leading to the air chamber. As it may be readily understood, after the pipe leading to the check valves is filled with water, and when the pump inspires, it will lower the water column in the pipe, and thus create a vacuum; this will cause the check valve to the left to open and fill the empty space with air; on the return stroke of the plunger this air will be forced through the check valve to the right into the air chamber. The globe valve or cock placed next to the pump chamber is to regulate the amount of air required in the air chamber.

The function of a vacuum chamber is entirely reversed to that of an air chamber. An air chamber is placed on a pump to change an intermittent flow to a continuous one, the vacuum chamber serves as a storeroom for a continuous flow to be converted into an intermittent one. When the suction lift is a very small one and the suction pipe short, a vacuum chamber is not absolutely necessary for proper running of the pump, but when the suction lift is high and the supply pipe long, a vacuum chamber must be used to take up the inertia of the water column, which will prevent the water hammer and other evil influences. The vacuum chamber should be placed as near the pump as possible. Ordinarily the size should not need to be more than about half the capacity of the air chamber used, but it is preferable to make it long and of small diameter.

Suction and Delivery Pipes.

The suction pipe should be as short and direct as possible, and everything which would tend to restrain the free flow of water should be carefully guarded against. It should be large enough and of one diameter from end to end; the velocity of flow should not exceed 200 feet per minute. A slower movement of the water is desirable for the reason that the resistance is reduced and cramping or enlarging the pipe at places will interfere with that uniform rate of flow so essential to proper filling of the pump. The suction pipe must be air tight and should have a continuous rise from the water level to the pump; any irregularity in laying would create pockets. No more angles and bends should be used than absolutely necessary; should the conditions compel the use of many bends, the diameter of the pipe should be correspondingly increased.

Long suction pipe or high lift require a foot valve. The function of a foot valve is to hold the water in the pipe in case of temporary shutdown of the pump and also for "prim-

ing." Suction consists in creating a more or less perfect vacuum in the suction chambers and suction pipe and filling the same with water at atmospheric pressure. Before a pump will work properly it must be able to create such a vacuum or to "prime" itself. The priming of a pump when there is no water requires either filling of the pump from some other source and a consequent expulsion of the air, or that the empty pump shall act as an air pump and thus remove the air. When there is water to be had from the delivery line, a charging pipe should be connected from said line to suction pipe for priming purposes, to fill the suction pipe and pump with water. A relief valve should be placed somewhere above the discharge valves. This relief valve should be opened when priming a pump in order to allow the air to escape.

The size of the delivery pipes required is nothing else but a problem of friction, and if the line is long, the first cost and the coal bills will have a great deal to do with determining the size. Pumps manufactured for the trade have usually the delivery opening of such a size as to give the water a velocity of 300 to 400 feet per minute.

Locating of Pumping Machinery, Etc.

The conditions under which the water supply must be obtained will to a large extent control the type of pump to be used. It is always desirable to place the water end of the machinery as near the water as possible, while the power end must usually be placed above high water, or if placed below water, it must be placed in a water-tight shaft or compartment. The ordinary horizontal type or reciprocating pumping machinery should seldom be placed more than 18 feet above the lowest water it is called to handle. A section lift of 24 or 26 feet is, however, sometimes possible. Where the distance from pump to water surface is greater than the maximum, and especially where large volumes of water are to be handled, such lift becomes hazardous or impossible, and other types of pumps must be used for other methods of locating the machinery employed. The most obvious methods of reaching water when it is below suction distance is to sink the pump to such depth below the surface as to bring it within easy suction distance of the water. When the distance is not too great and where the conditions are favorable this can readily be done, and this method has frequently been employed. The water ends of pumps demand but comparatively little attention. The flow of the water lubricates most of the parts to a considerable extent, and such as are not in this way sufficiently lubricated can be easily cared for by attention at occasional intervals. The motor end of the pump, however, is usually more complicated and necessarily requires more particular and constant attention. When, therefore, the depth at which the water is obtained is considerable, it is often desirable to rearrange the design of the pumping machinery, placing the water end within easy suction reach of the supply, and the motor end within easy access from the surface or high water mark, and also near the source of power. This has given rise to various types of vertical pumping machinery.

In some cases where the water is raised from deep wells from a depth of 150 feet or more below the surface, electrical transmission is used, the current supplied from a central generator, the water being raised by separate pumps and forced into the reservoir near the surface, from which it is taken by a surface pump and pumped into the mains and standpipes. This is done where shaft and tunnel work is expensive and where it becomes desirable to install small isolated plants on each well, which may be operated singly or together as the water required demands. Separate steam pumps may be applied to such wells, but usually such pumps are far from economical, and particularly in cases of this kind.

Pneumatic and hydraulic transmission are also sometimes used. As an example how hydraulic transmission is used with good efficiency, a centrifugal pump is put in each well, operated by impulse water wheels. The water which operates these wheels is taken from the mains, supplied by a high duty engine. This water together with the water pumped by the centrifugal pumps is returned to the main supply well.

Different Types of Pumps and Pumping Machinery.

In a large and important class of pumping machinery the steam and water cylinders are placed in the same machine in a compact shape; such pumps are called steam pumps. Numerous varieties of this class of pumps are in use.

From the methods of application of steam this class of pumps is divided into high pressure steam pumps, which include all those in which steam is used at its initial pressure for a full length of stroke in the cylinder and not again used, and compound steam pumps, in which the steam is used expansively in two or more cylinders. The arrangement and design give rise to other divisions. In the direct acting pump the steam piston is connected by means of a piston rod with the pump piston or plunger, the piston rod being common to both steam piston and water plunger. The only method of using steam in this form of pump is to exhaust it from the high pressure cylyinder directly into the low pressure cylinder and use it in both cylinders for the full length of stroke, and without the use of cut-offs. The gain in compounding such a pump over a high pressure steam pump is from 20 percent to 30 percent, depending upon the initial steam pressure and ratio of expansion. The initial steam pressure should not in this be less than 70 pounds.

The duplex steam pump, so familiar to everybody for its ideal simplicity, with its efficient valve motion, to which it owes its complete exemption from noise or concussive action, is due to the late Henry R. Worthington. It consists of two steam pumps side by side, with the valve motion so designed that the movement of the steam piston of each pump shall have the controlling movement of the steam valve of its opposite pump, the effect of which is to allow one piston to proceed to the end of its stroke and gradually come to a state of rest. During the latter part of this movement the opposite piston then moves forward in its stroke, and also comes to a state of rest, but in its movement forward and before reaching the end of its stroke, the steam valve controlling the first piston is reversed, and in consequence the first piston returns to its original position, and in nearing the end of its stroke it, in a similar manner, reverses the steam valve, controlling the second piston. These movements are both uniform and continuous.

The time allowed at the end of each stroke before the piston takes up its return motion is sufficient to permit the water valves to seat quietly and to allow the incoming supply to completely fill the water cylinder.

To attain the best economy possible with greater rates of expansion, and still obtain the compactness of this type of pump, various types of compensators have been introduced. The Worthington device is perhaps the best known type. In this machinery the energy of the steam at the beginning of the stroke not only overcomes the resistance of the water pumped, but also forces hydraulic plungers, moving in trunnions, against a fixed pressure stored in an accumulator. When the center of the stroke is reached this stored energy is gradually returned to the pump after the steam is cut off and when it is expanding in the cylinder. A decided increase in the economy of operation results.

Another type of compensator is the Heisler. In this form of compensator the cylinder of one side at full steam pressure transmits a portion of its force to aid the other side, which is working expansively.

The greatest economy in pumping machinery has been developed by what is known as the crank and flywheel type, of which the Allis type is probably the most popular at the present time for large water works engines. These engines can be seen at Brilliant pumping station. But the Allis-Chalmers Co. are not the only builders of this type, although Mr. Edwin Reynolds must be given credit for the original design, as applied to pumps.

Hydraulics of High Pressure Pumps.

The transmission of power by means of water under high pressure is now generally employed in handling Bessemer converters, cranes, charging apparatus and other machines in the steel works, also in ship building, boiler making and other kindred establishments, in riveting, shearing, punching, bending and flanging machines and for numerous other purposes.

The duplex steam pump is the one in general use for this class of work. Geared power pumps or pumps driven by independent steam engines are seldom met with. Attempts have been made to introduce crank and flywheel pumps for

this class of work, on account of economy of fuel, but to the writer's knowledge never met with any particular success. The reason for this is very obvious when the nature of operation is taken into account, and particularly so in steel works. The hydraulic machinery is the most expensive and the hardest worked part of the plant, and the constancy and steadiness of the pumping power is the most vital feature of the whole machinery. Any delay or serious fluctuation in its operation in handling fluid masses of iron and steel is fatal to the commercial success. The strain on the pump is constant, but the velocity momentarily and suddenly varies by the demand for water from a low to the highest speed, and sometimes the pump may stop momentarily and then be suddenly brought into service. To meet successfully with these conditions a crank and flywheel pump could hardly be thought of.

Compound steam pumps are not recommended for pressure pumps where the service is very irregular, that is, where a pump works with great violence for a few minutes and then comes to a state of rest. If the action of the pump could be made continuous over long intervals of time, say several hours, then compounding is recommended, providing the initial steam pressure is not less than 70 pounds. In many cases, however, the pump could be made to work more regular, provided it is made large enough for the purpose, and if a large enough accumulator is furnished.

In designing the water end of these pumps extra precaution should be taken in selecting the proper metal to suit conditions, also, first and last the design itself. The water end should be made in several parts, so in case of breakage of any part it can be easily replaced with little cost or delay. In the general remarks made on designing pumps in the first part of this paper, it is of most importance to be particular in having all parts of the pump end made round with absolutely no air pockets. And do not be stingy with metal. Shocks will be transmitted from machinery operated by the pump sometimes amounting to several times the ordinary working pressure. Sometimes this will be caused by a descending accumulator running at high velocity. The sudden arrest at the bottom of its fall causes a blow, and water being practically incompressible, the shock is transmitted throughout the whole system including the pump. For these reasons the ordinary factor of safety as ordinarily used, for figuring thicknesses of metal, is not at all sufficient, especially if cast iron is used. Cast iron has a tendency to split open at the center of juncture of two or more pieces, and specially if these pieces are of unequal thickness, the common defect being a drawing away of the outer skin of iron from the center and forming a cavity within.

A high pressure pump should have a longer stroke than that ordinarily given to trade pumps, as the wear of a pump depends on the number of reversals of motion made in a given time, their durability is proportionally increased by this feature.

The water end can be made of cast iron, having a tensile strength of 25,000 pounds to the square inch, providing the plunger is not more than 7 to 8 inches in diameter and the pressure not over 500 pounds. If the plunger is more than 7 of 8 inches in diameter or the pressure more than 500 pounds aand not over 1,000 pounds, good air furnace cast iron, having a tensile strength of 40,000 pounds per square inch, could be used, but the writer would prefer open-hearth steel castings, not because the latter is so much stronger, but the nature of it is more like wrought iron, with less chance to rupture. For larger pumps or higher pressure steel castings should be used exclusively.

A few years ago it was almost impossible to get satisfactory castings from the steel foundries in this country. The castings had a terribly rough looking appearance; they were full of blow-holes and almost impossible to machine; but now good steel castings can be had that will answer all purposes.

For small pumps, with plungers not much over 3 inches in diameter, phosphor-bronze has been used with good satisfaction for pressures as hight as 7,000 to 8,000 pounds to the square inch, but phosphor-bronze is porous, and the inside of the castings must be thoroughly coated with paraffine, shellac or something kindred, before using.

The valves and seats are invariably made of phosphor-bronze or hard gun metal; a number of small valves with low lifts should be used.

Mining Pumps.

The service of mine pump is generally rough, severe and continuous, and very often it has to perform a high duty, being down in the mine and pumping at a high elevation. There are a few cases in this country where the engines are on the surface, but in most cases the pump with the motive power is placed under ground. Great care must be exercised, both in the selection and adaptation of the material used for the construction, as the water to be pumped is often of a kind that will attack and quickly destroy a material not judiciously selected. The location of the mine is usually remote from supplies and necessities for renewals or repairs, and unless they can be made by unskilled labor and with little delay, may be attended with serious consequences.

All parts exposed to pressure should be subdivided as much as possible, and should be properly proportioned as to strength. The valve mechanism should be made as simple as possible, with the least possible chance to get out of order. Outside packed plungers are to be preferred as dirty or gritty water is the common thing in a mine, which will cut out the cylinder or lining very fast. When the water is full of acids as is invariably the case in the Pittsburg district, phosphor-bronze plungers and tobin-bronze piston rods are recommended, and in some extreme cases the entire water end must be made of phosphor-bronze.

The singular feature of interest is that, although acid water does not attack bronze, it at times corrodes the iron around the machined surface where a bronze valve-seat or bronze liner is inserted. This is due to a galvano-chemical process taking place between the two metals, the tendency is to loosen the valve seat or liner as well as corroding such other portions as have been machined. The acid does not readily corrode the rough parts of the casting.

Pumps driven by electric motors placed in water-tight casings have been in use for some time and appear to give good service. The advantage of using electricity instead of steam for motive power in the mine is obvious. The steam pump often requires the transmission of steam through long lines of pipes, involving a large loss of steam by condensation, whereas, electric transmission is effected with but a trifling loss, and, last but not least, the electric current is far more efficient than a steam pump; but on the other hand, the steam pump is by far the simplest machine.

Steam Jackets.

The actual value of the steam jacket has always been an open question, some early writers have absolutely condemned it, but it steadily grew in favor with engineers. The writer of this paper does not believe that any saving can be counted on by steam jacketing a duplex compound pump, and particularly so in the smaller sizes. A liberal covering of some good non-conducting material, mineral wool, hair felt, nonpareil cork, is good for that purpose. This does not exactly take the place of the steam jacket, but it does to a very great extent prevent radiation from the steam cylinders, and if we count up the additional cost of a pump with jacketed cylinders plus the cost of steam required to supply the jackets, it will, in the writer's experience, not be in favor of the jacketing.

For high grade engines, using steam expansively, some saving may be effected, but nothing like 20 to 30 percent, as some engine builders a few years ago claimed for the steam jacket. Some years ago Prof. Denton made a thorough and exhaustive test to determine the value of this. The pump was of the high duty Corliss type, installed at Pawtucket Water Works. The experiment was conducted along the lines of every-day usage and service, and has a special value for that reason. The conclusions reached by him form a very elaborate and convincing paper published by the American Society of Mechanical Engineers, and the final conclusions are as follows:

1. That the averages of results of indicator cards, taken in the most careful manner with the best modern indicators, show a possible saving from the use of the jackets amounting to from 0.13 to 0.35 pounds of steam per hour horse-

power, but that these amounts are within the limit of error to which the determination of indicated horsepower and cut-offs are subjected, so that

2. The most that can be claimed for the jacket is that it probably caused no loss, and may possibly cause a saving not exceeding 3 percent of the total steam consumption.

Duty and Efficiency of Pumping Machinery.

Duty may be expressed in almost any units, but in pumping it usually represents the ratio of foot pounds of work done to a fixed weight of coal, or steam, or to a fixed number of heat units used. The terms almost exclusively used to express duty of pumping engines are foot pounds per 100 pounds coal, per 1,000 pounds of steam, or per 1,000,000 heat units. It must be understood that the duties expressed in the above units are not necessarily equivalent, but vary largely in actual value. If the coal used evaporates 10.35 of water from, and at 212° F. per pound of coal, the heat units delivered to the engine will be exactly 1,000,000 per 100 pounds coal burned.

Duty based on coal is very indefinite, for coal varies largely in its potential energy or calorific value. When coal is considered, the plant efficiency must also be included. This may include boilers, steam pipe, feed pump, heater, etc., which necessarily have not any relation to the individual efficiency of the pump itself. Duty based on coal should therefore only be based where the entire plant is considered and when the class of coal is specified. Duty based on steam is more specific, but hardly sufficiently so. Both theory and practice show that, with suitable conditions, steam at 150 pounds pressure has greater value than steam at 90 pounds pressure. The entrained water from the boiler and the condensation in the steam pipe also modifies the results. When duty is based on the weight of steam used, the term dry steam and a specified pressure should also be included.

The duty of a pumping engine may be calculated from the formula:

$$\text{Duty} = \frac{\text{weight of water pumped x head x duty unit}}{\text{amount of energy used.}}$$

The "duty unit" is 100 for coal, 1,000 for steam, and 1,000,000 for heat units. The "amount of energy used" is the total weight of coal or steam or the number of heat units used.

DUTY AND EFFICIENCY OF PUMPING MACHINERY.

Class—		Duty per 1000 lbs. of Steam.	Pounds of Steam Per I. H. P. Per Hr.	Theoretical Efficiency Per Cent.
High Duty Engine	max.	160	12.3	20.6
	min.	100	19.8	12.9
Pumping Engines	max.	100	19.8	12.9
	min.	75	26.4	9.8
Large well designed Steam Pump	max.	40	49.5	5.2
	min.	20	99.0	2.6
Ordinary designed Steam Pump	max.	20	99.0	2.6
	min.	10	198.0	1.3
Direct Acting Deep Well Pumps	max.	6	330.0	.77
	min.	2	990.0	.26
Vacuum Pumps	max.	8	247.5	1.04
	min.	2	990.0	.26
Jet Pumps	max.	4	495.0	.52
	min.	1	1980.0	.13

These results may be considered fair average results of well designed plants. Results much higher may be obtained under ideal conditions, and much poorer results are only too common in actual practice.

A meeting of the American Charcoal Co., which was formed eight years ago with a capital of $100,000, was held in Buffalo, May 11, for the purpose of concluding a new contract with the Manufacturers' Charcoal Co. After discussion the matter of renewal was referred to the directors of the Merchants' Charcoal Co. for action at a meeting of the latter company to be held at Bradford, Pa., within two weeks. If the new contract is signed it will prolong the life of the American Charcoal Co. four years from Jan. 1, 1906. If not renewed the latter company will probably be dissolved on that date.

The message of President Diaz, of Mexico, states that the mileage of the railway system of that country now aggregates 10,078 miles.

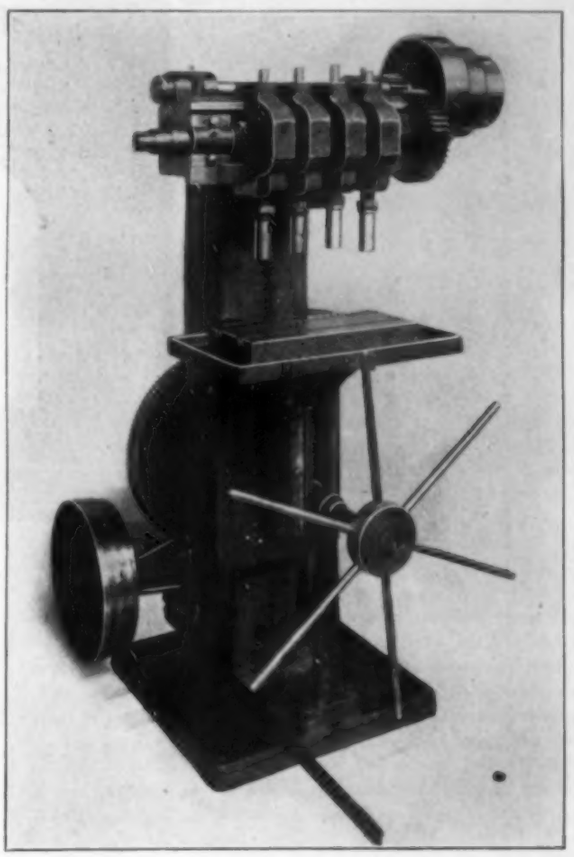
John D. Rockefeller has contributed $200,000 to the Case School of Applied Science, Cleveland, for the erection of laboratories of physics and mining engineering.

A NEW GANG DRILL.

The Moline Tool Co., of Moline, Ill., has recently designed and built a gang drill which is known as the No. 5. This machine has vertically adjustable spindles which may be set to within 2 inches of each other or spread to 20 inches. These spindles are driven by bronze spiral gears meshing into two continuous spirals which run the entire length of the head. This permits the spindles to be adjusted to any position without reference to the drive. The adoption of two spirals enables the designer to get a very powerful drive and still allow the heads to be set very close together.

The cross rail can be furnished of any desired length. The heads are fitted to a V as well as a flat bearing and any of the heads may be easily removed when not in use. The rail and the column have a square tubular form, which ensures a maximum amount of stiffness.

The table is counterweighted and has a cam feed of 5 inches, with a vertical adjustment of 5 inches independently of



A RECENTLY DESIGNED GANG DRILL.

the feed. The table may be furnished with a rack and pinion feed when this is ordered.

At the annual meeting of the stockholders of the Shelby Iron Co. held in Jersey City last week, the retiring board of directors was re-elected, with the exception that E. Norton was elected as director of the first year class in the place of Granville W. Garth, deceased.

The Pennsylvania railroad has advertised for bids for the construction of piers for a new $1,000,000 steel double-track bridge over the Susquehanna river at Havre de Grace, Md. The work consists of twenty immense piers, eight of which will probably have to be built by pneumatic process.

Charles E. Smith and Charles W. Gearing have been appointed receivers for the Angell Mfg. Co., of Franklin, Pa. The company has a finely equipped plant for the manufacture of tools and oil well appliances.

A NEW SEMI-RADIAL DRILL.

The new semi-radial drill made by the Bickford Drill & Tool Co., of Cincinnati, has its general proportions presented by the half tone, Fig. 1, but the view of the bearing for the upper cone pulley is of especial service in depicting the manner in which the overhanging cone is supported. This is illustrated in the sectional view in Fig. 2 and is self-explanatory.

The chief characteristics of the machine are rigidity, simplicity and durability, which, combined with a high ratio of transmission gears, make it an admirable tool for many classes of work. The head, on which all bearings are of uncommon length, consists of a single casting and is adjustable on the arm by means of a spiral gear, which gives it an easy and quick motion. The spindle is made of hammered steel and has an unusually great vertical adjustment for a machine of this size; it is provided with both hand and power feed and quick advance and return.

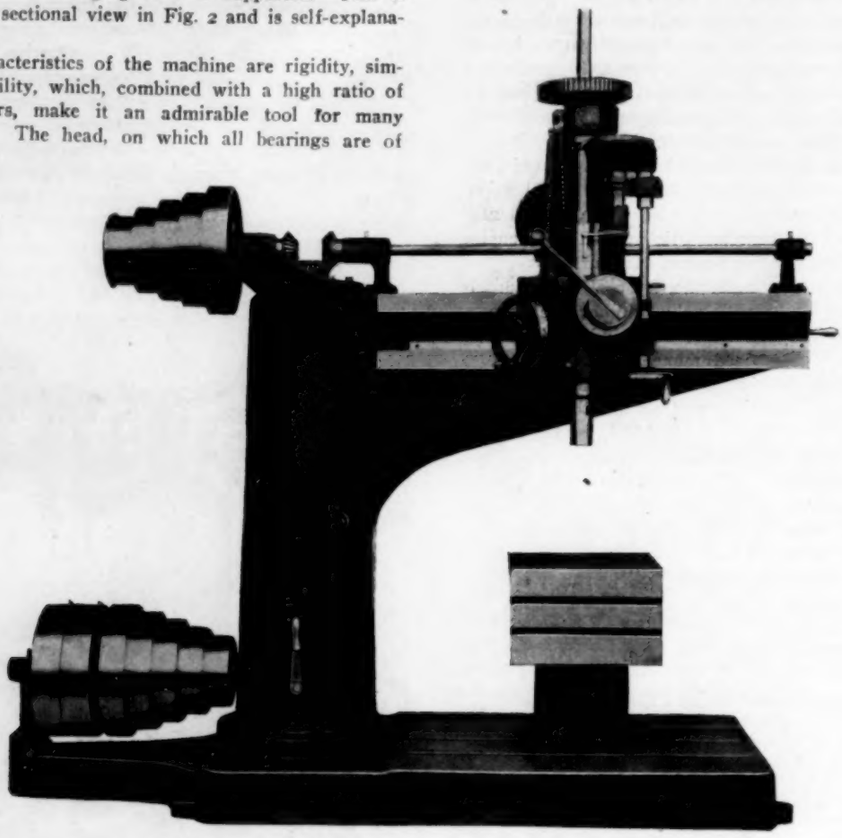


FIG. 1.—THE BICKFORD DRILL & TOOL CO.'S SEMI-RADIAL DRILL.

The feeding mechanism furnishes three rates of feed, advancing by even increments from .008 to .016 inch per revolution of spindle, each of which is instantly available by means of the Bickford Drill & Tool Co.'s standard drive key. The driving mechanism contains but seven gears, the pitch and periphery speed of which are conductive to long life. The speeds are five in number and advance in geometrical progression from 50 to 170 revolutions per minute.

The frame may be said to consist of but five parts, the base, column, cap arm and arm shaft, each of which are commensurate with the continuous severe work expected of a machine of this character.

The general dimensions are as follows: Diameter of spindle, least section, 1 13-16 in.; spindle bored to fit No. 4 Morse taper; traverse of spindle, 18 in.; horizontal range of head, 3 ft. 6¼ in.; receives under spindle over table, 24 in.; receives under spindle over base, 4 ft.; receives under spindle over floor, 4 ft. 7 in.; drills work in plane of base to center of, 8 ft.; size of table, working surface, 20 x 20 in.; distance from floor to extreme height of spindle, 9 ft. 4¼ in.; width of cone belt, 3 in.; floor space required, 9 ft. 3 in. x 11 ft. 9 in.; weight, net, 6,500 pounds.

John Samson, editor of the *South American Journal*, in a letter to the *Mark Lane Express*, of London, Eng., March 14, 1904, says: "The American traction engine is rapidly ousting the British type. It is claimed that it is lighter and can get more easily over the ground, and, in fact, can cross places where the heavier English engine would be stuck. The system of short stroke with rapid revolution is said to be much better for the requirements of the conditions than the older pattern. Many American engines are being sent out with English thrashers. The price of the American engine is also considerably less. It was long an axiom at the River Plata that the English thrashing machine could hold its own against all rivals. This is no longer the case. American thrashers are daily becoming more in use, and for the simple reason that they are able to do much more work in a given time. An English thrashing machine will turn out 1,500 to 2,500 bushels of wheat per day and require the services of 18 to 21 men; whereas the American machine will deliver 4,000 to 6,000 bushels and only require the aid of 8 to 10 men. In a country where harvest hands are scarce and highly paid—as much as $1.44 per day with food—this is important."

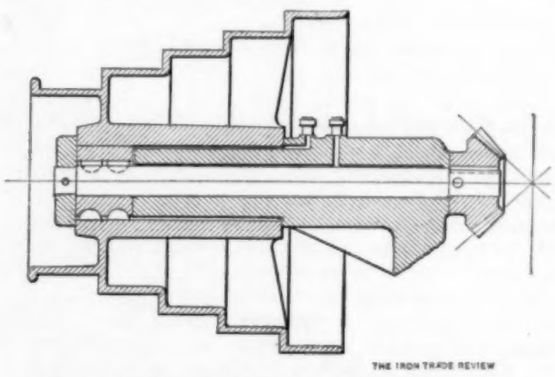


FIG. 2.—CONE PULLEY BEARING OF SEMI-RADIAL DRILL.

Creditors holding claims of $1,515 having filed a petition to have the Illinois Forging & Mfg. Co., Chicago, adjudged bankrupt, Judge Kohlsaat appointed a receiver.

THE IRON ORE DEPOSITS IN SOUTHERN UTAH.

BY FRED LERCH, E. M.

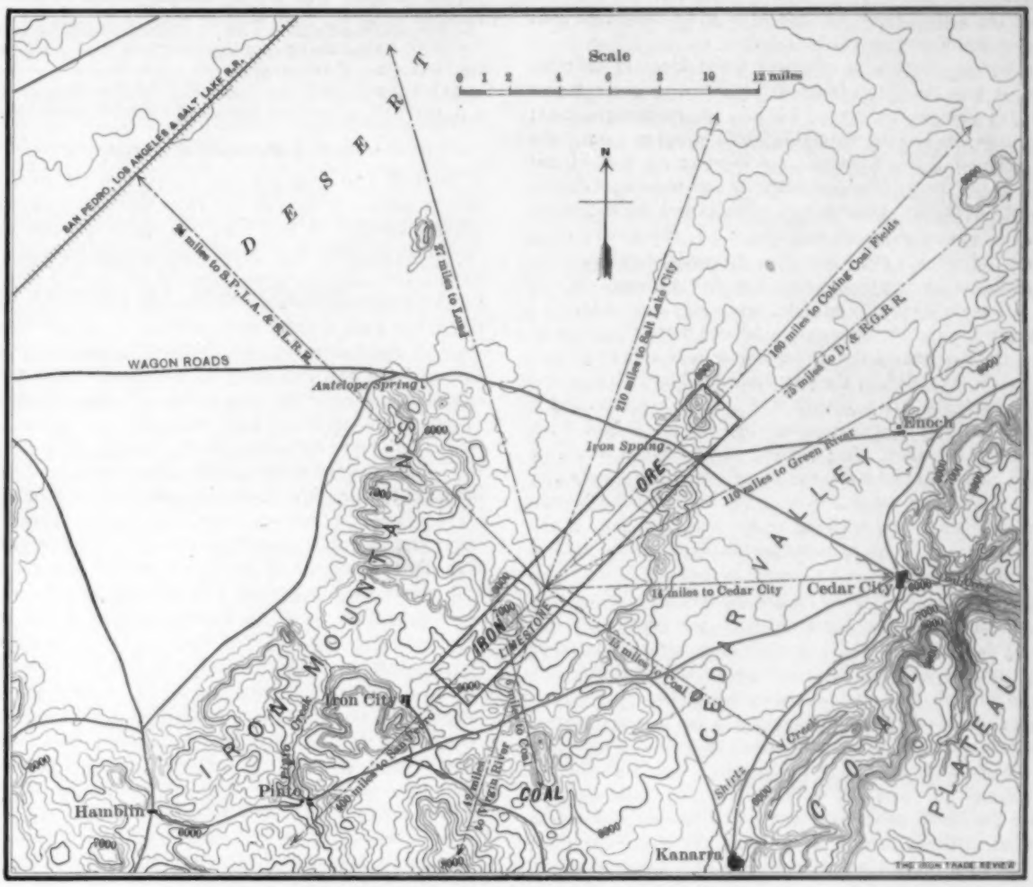
The iron ore district of Southern Utah lies about 250 miles southwest of Salt Lake City and about 30 miles southeast of the Salt Lake & Los Angeles railroad, which is now being constructed through Nevada and California to Los Angeles and San Pedro harbor on the Pacific coast, the distance to San Pedro being about 400 miles. The elevation of the ore bodies varies from 5,500 to 7,750 feet above the sea level, or from 1,300 to 3,500 feet above Salt Lake City. When the proposed railroad is built from the district to the Salt Lake and Los Angeles line, it will be about 275 miles to the excellent coking coal fields in the central part of Utah, or, if the proposed extension of the Denver & Rio Grande system is built, for which contractors' estimates have been asked, this distance will be lessened to about 175 miles. There are no streams of water in the immediate vicinity but springs are close by or water may be obtained by sinking wells on the flat at the base of the mountains down to the sandstone. The district is divided into two parts by an arm of the Escalanta Desert, the distance between them being five miles, the larger and by far the more important is known as the Iron Mountain District and the other as the Iron Springs, and all of the known ore bodies are included in a rectangle 16 miles long by two miles wide. Further work alone can determine if any ore lies beneath this desert and along the general trend of the formation.

Geology.

An able article by Dr. C. K. Leith, of the United States Geological Survey, is now in press, so we will dwell but briefly on this point. There are two classes of veins: contact, between the limestone and andesite, and fissure in the andesite. All of the large bodies of ore, which are hematite, lie along the contact, while the smaller ones along the contact and those in the andesite, for the greater part, are magnetite. Both classes of ore outcrop very prominently and this is especially true of the magnetite which outcrops at various places, projecting several feet above the surface. From the information available it appears as if the magnetite is partaking more of the nature of a hematite as depth is attained. Exploration work has shown this to be true in some cases. The body of the mountain is andesite, while the limestone skirts around the base, and as neither the andesite nor the limestone carries much iron, the latter about 1.25 percent, it causes one to ask, whence came the iron? The difference in elevation of more than 2,500 feet of the different ore bodies is unusual for the same iron district or range. It is another geological problem that needs explanation, similar to the Silver Reef mine about 30 miles south of the iron ore deposits, where chloride and native silver have been found in the sandstone in sufficient quantity to make its extraction very profitable for years.

Size and Character of the Ore Bodies.

The ore bodies, of which there are a great many, vary in length from less than 100 feet to more than a quarter of a mile and in width from a few feet to more than 600 feet. The ore body or vein, with a width of more than 600 feet, the writer believes, is the widest vein of iron ore in the United States.



MAP OF THE IRON ORE DISTRICT OF SOUTHERN UTAH.

In making this comparison the depth of the flat deposits on the Mesabi range in Minnesota must be considered the width, for such it would be if the Mesabi ore bodies stood on their edge. With its length of a little more than 1,400 feet, with a width of at least 600 feet, we have an area of 19.3 acres covered with ore. On the Mountain Lyon group of claims, two lines could be laid at right angles to each other, underlaid entirely with ore, as shown by test pits, the one line having a length of 1,050 feet and the other 1,450 feet. This ore body is crescent shaped. The three largest ore bodies, held by Milner, Dear and Lerch, cover a little less than 40 acres and for each foot of depth there would be 140,000 tons of ore, or for 130 feet in depth, this being the deepest test pit with the bottom still in excellent ore, there are 18,000,000 tons. As this is a well defined contact vein, with limestone and andesite walls, we have every reason for supposing—for a property that has not been explored thoroughly—that it will continue in depth for 1,000 feet or more the same as the copper and lead contact veins in that country. It is proposed to put a diamond drill on these

large bodies in the near future to ascertain definitely the depth and character of the ore. The average depth of the surface overlying these three ore bodies covering about 40 acres is only four feet, the depth having been determined by sinking 361 pits down to the ore.

Quality of the Ore and Coal.

From a physical standpoint the ore is a very desirable one, as the largest ore bodies are a soft porous hematite, but free from the fineness that causes the objectionable flue dust, characteristic of so many of the Mesabi range mines. There is also considerable hard hematite, similar to that in the Tower mine on the Vermillion range in Minnesota. The hard magnetic ore, comparatively speaking, will not be of much commercial importance in the near future on account of its slow reducing or smelting property in the blast furnace. Pig iron is far more expensive when produced from a magnetic ore than when made from a hematite, because, as previously stated, the reduction in the furnace is so much slower, consequently the yield from the furnace charged with hematite would be much larger in the same period of time than when magnetite was used, other conditions being the same.

The complete analysis of a sample taken from 17 different outcrops on Iron Mountain showed the following percentages: Iron, 64.71; phosphorus, 0.174; silica, 4.25; manganese, 0.23; alumina, 0.88; lime, 1.02; magnesia, 0.08; sulphur, 0.020; and loss by ignition, 0.38. A sample representing 291 feet of test pit work in the three large soft hematite ore bodies previously mentioned, of Milner, Dear & Lerch, contained the following percentages: Iron, 56.24; phosphorus, 0.136; manganese, 0.27; silica, 9.67; alumina, 1.08; lime, 1.8½; magnesia, 1.12; sulphur, 0.039; and loss by ignition, 3.02. The low moisture in this sample is especially worthy of note, being only 4 percent.

In 1902, when the Mesabi range produced more than 13,000,000 tons, the average of the 44 leading grades was 61.46 percent of iron when dried, or the percentage of iron in its natural state as mined was 55.15 percent, the average moisture being 10.27 percent. The sample representing the 291 feet of Utah test pit work contained 56.24 percent of iron when dried, or 54 percent in its natural state, the natural iron being only 1.15 percent less than the natural iron of the ore from the Mesabi range, the largest iron producing region in the world. If the hard Utah hematite were included in this average, the natural Utah ore would contain a much higher percentage of iron than the average of the Mesabi. In the pit 130 feet deep, the sample taken from 50 to 110 feet contained 60.22 percent of iron and the last 15 feet, 58.43 percent. A piece of hard hematite taken from an outcrop contained 69.50 percent of iron and only .015 percent of phosphorus. It is quite evident from the complete analysis of the test pit sample that there is not a single serious objectionable element in the ore except the silica, which is a little too high, and the phosphorus, which is too high for the acid Bessemer process; but an excellent pig could be produced for the basic open-hearth method of making steel, being the same as that successfully employed by the Tennessee Coal, Iron & Railroad Co. for manufacturing steel rails in Alabama. The phosphorus is very irregular in the ore. A test pit sample taken from 10 to 20 feet contained 0.140 percent of phosphorus; from 20 to 30 feet in the same pit, 0.023 percent, and from 30 to 40 feet, 0.140 percent. Ten-foot samples as low as 0.017 percent of phosphorus have been taken from the test pits. It is rather doubtful if it would prove profitable to mine separately the Bessemer and non-Bessemer ore, and it is probable that further exploration work will show a greater proportion of Bessemer ore as depth is attained.

Some of the beds of coking coal are ten feet thick and the following percentages represent the average of two samples: Volatile organic matter, 45.64; fixed carbon, 51.24; ash, 2.78; sulphur, 0.46; and a trace of phosphorus. The resulting coke contained the following: Volatile organic matter, 2.98; fixed carbon, 91.50; ash, 5.28; sulphur, 0.38; and a trace of phosphorus. The coke possesses a firm physical structure and will support a heavy burden without crushing.

Facilities for Cheap Mining.

All of the large ore bodies lie along the base of the mountains at the edge of the desert and are easy of access for a railroad and can be mined very cheap with a steam shovel as on the Mesabi. If the demand for the ore was large enough to keep the shovel in continuous operation, the ore could be mined for less than 15 cents per ton. These ore bodies should not be classed with the flat or bedded formations like the Mesabi range, for they are true contact and fissure veins of unknown but probable great depth and the amount of stripping required to uncover the ore body is remarkably small, 40 acres being covered with only 4 feet of surface, especially when the number of tons of ore that would be uncovered is taken into consideration. The deepest test pit has been sunk 130 feet by hand, all in ore, the pit being located in a ravine with the ore rising on both sides of it. It is bottomed in ore and contains no water, the ore carrying only 4 percent of water. Millions of tons of ore can be mined without pumping any water, but a sufficient supply for operating use can be obtained from wells or springs close by. The low moisture will also lessen appreciably the cost of handling the ore, as additional water would be so much more dead weight to move. Excellent dumping grounds for the surface removed lie next to the ore. Plenty of good coal for steaming purposes can be obtained 15 miles from the iron ore, the coal being easy of access. A four-foot vein of coal containing 66 percent of fixed carbon lies less than 6 miles south of the iron ore. A good level wagon road extends to Cedar City ten miles east. This is a farming settlement of about 1,500 people.

Commercial Prospects.

There is but little pig iron made west of Pueblo, in the eastern part of Colorado. Twenty-five years ago there was a small furnace located here, the entire product being consumed at Pioche, Nev., a great silver mining camp in those days. The old stack was torn down and a new one was to take its place, but it never rose any higher than the foundation. For such a small plant as that, all of the material was close at hand, the ore and limestone requiring a three-mile haul and the coal five miles. For a larger plant there is not enough water close by, so it will be necessary to haul the ore to water, either the Virgin river at St. George about 40 miles south or to the Green river about 375 miles to the northeast. The former place has the advantage of a shorter haul both for the ore from the mine and for the finished product to San Pedro harbor, while the latter would furnish not only water but also coal—good coking coal—and limestone in the immediate vicinity. This location would require a haul of from 700 to 800 miles to the Pacific Coast. As the iron ore lies about 6,000 feet above the Pacific Coast, it would be a down hill haul hence should lessen the cost of transportation. The inter-mountain country would not furnish a market large enough to warrant the construction of a plant producing but one or two lines of product, but it would make a good opening for a diversified line, for foundry pig, bar iron, plates, structural shapes, pipes, wire, nails and basic open-hearth steel. Steel rails could be made from the latter, for the small additional cost of rails made from basic open-hearth steel over those made from Bessemer steel in the East, could be overcome by the advantage in freight rates for the western part of the United States. If it is found by further exploration that the phosphorus lessens with depth, Bessemer steel could also be made. The Colorado Fuel & Iron Co. have now, and have had during the past few years a great many men engaged in exploration work in this district. They have a great many claims and the probability is that they will be shipping a large amount of this Utah ore to their Pueblo plant before two years go by, as it is reported that their available supply in Colorado, Wyoming and New Mexico is limited and the cost of mining is so much greater than it would be in the large Utah ore bodies. The excellent coking coal within a few hundred miles of the iron ore adds greatly to the value of the latter, especially as it compares favorably with that produced in Pennsylvania. The coal lies along the Denver & Rio Grande railroad system. With a coking coal, iron ore, manganese ore and limestone, all of an excellent quality, and a river within a radius of 100 miles the conditions for a large iron and steel plant are excellent. From Green river, Utah, the proposed site for the works to Pueblo is about 400 miles, and to San Pedro harbor, 750 miles. The territory north and west of the plant, including the Pacific Coast States and the Orient, would be its market, with present and proposed railroad connections. Wtih a diversified line of manufacture, the field is an enticing one for the capitalist and investor, for it would not be unreasonable to expect to find, with further exploration and development work in depth, more than 100,000,000 tons of ore.

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MAY 19, 1904

National Association of Manufacturers at Pittsburg.

The National Association of Manufacturers, with an attendance of about 300 delegates, opened its ninth annual convention at Pittsburg on Tuesday morning, May 17. The headquarters of the association were established at the Carnegie Institute and the sessions were held in the music hall. The convention was called to order by D. C. Ripley, of Pittsburg, chairman of the local general committee. The invocation was given by Rev. S. Edward Young, and City Solicitor W. B. Rodgers welcomed the delegates on behalf of the mayor of the city of Pittsburg. Adjutant General Thomas J. Stewart represented Gov. Samuel W. Pennypacker in extending a welcome to the State. Hon. James W. Brown, on behalf of the chamber of commerce and the business men of Pittsburg, welcomed the visitors and took occasion to tell of the greatness of Pittsburg as an industrial center. At the conclusion of the addresses of welcome David M. Parry, president of the association, was introduced and began by saying that he believed it customary for the presiding officer to make a speech of some kind before taking the chair, but asked that he be permitted to make this occasion an exception to the rule. He added that he was gratified to assume again the duties of presiding officer over the convention of this association and added that during the past year the organization had shown a phenomenal growth, more than 1,000 new members having been added, the membership now being 3,003. President Parry's report was distributed in printed form but was not read. It is taken up largely with a discussion of the labor issues that have come up in the year, and this portion is given quite fully in other columns. The address refers briefly to some of the other questions to which the association has devoted a good deal of attention. Of reciprocity Mr. Parry says that, while the question for the time being is attracting comparatively little attention, there are indications of a strong revival of agitation of it in the near future. A sub-committee of the executive committee has this subject in hand. Gains in foreign commerce in the past year were referred to. The international freight bureau of the association has had a remarkable increase in business in the past year. It was recommended that the association endorse the good roads movement, in line with its campaign for internal improvements as represented by river and harbor improvement and the development of the irrigation system.

The report of the treasurer, F. H. Stillman, was next submitted. The gross receipts for the year amounted to $142,296.05 and the expenditures to $139,414.63, leaving a balance in the treasury of $2,881.42 on March 31. .

Effective Work at Washington.

The report of the secretary, Marshall Cushing, followed. Referring to the public service rendered by the association, he said: "The responsibility for the defeat of the compulsory metric system bill, the anti-injunction bill, and the eight-hour bill fell, apparently by a process of natural selection, upon the National Association of Manufacturers. These were not merely the tasks of self-defense; they were the necessary burdens of self-preservation. While it is certain that labor bills, so-called, will be sure to have come countenance in Congress as long as there is a labor agitator or demagogue left in the country, I believe that our indispensable friends, the officers of other associations, would be the freest to admit that the national association has not been found wanting in these particular phases of the contest just ended, and that it was the national association which had the most to do with stopping, for a time at least, these industrial trespasses. I ask especially that every one of our members may believe that the response of all the industrial interests throughout the whole United States to the appeals for personal assistance made by our association have been invariably hearty and effectual, exceeding in effect, as they have surely exceeded in generosity, anything ever known hitherto in Washington. It is hardly less a satisfaction to be able to seize this chance to thank every one of our own members, on behalf of every other member, for the assistance which he, too, has given in these largest of all endeavors in which the association has been engaged."

The appointment of standing committees and the presentation of resolutions, which were referred to the committee on resolutions, then followed. Secretary Cushing read the following letter received from President Charles W. Eliot, of Harvard University: "I regret that imperative engagements here make it impossible for me to attend the meeting of the National Association of Manufacturers at Pittsburg on May 17-19. The most useful function of your association seems to me to be the arousing of the public to the formidable evils of the closed shop, the union label, the strike in support and the boycott."

F. C. Nunnemacher, of Louisville, Ky., read a paper on the open shop and said that the manufacturers of Louisville are a unit in its advocacy.

At the afternoon session Geo. H. Maxwell, secretary of the National Irrigation Association, read a paper on "Irrigation in the West." He urged the association to be more active in its efforts to secure legislation for further irrigation in the West and also called attention to the occupation of public land by Western syndicate, the usurpation of the public property not being interfered with by legislatures of the Western States.

Tariff Commission.

William McCarroll, as chairman of the resolution committee, reported a resolution for adoption which has for its purpose the establishment of a bureau in the Department of Commerce and Labor to investigate and report to the President and Congress tariff changes. The resolution follows: "Resolved, that the National Association of Manufacturers recommend to Congress the establishment of a tariff reciprocity commission as a bureau of the Department of Commerce and Labor to investigate and report to Congress and the President the effect of tariff changes. That Congress establish a maximum and minimum of tariff rates and authorize the President to change by proclamation, within the limits established, the tariff to carry into effect the reciprocity treaties, to oppose unfair combinations, or unfair trade or commerce in this country, or between this country and other countries." The resolution was unanimously adopted.

George J. Seabury, of New York, read a paper on "Our Present and Future Needs to Hold and Perpetuate Commercial Supremacy." The concluding paragraph of his paper follows: "With the construction of an American merchant marine, with our Department of Commerce, an Isthmian canal, a modern consular service, the Lovering drawback bill, an able tariff commission, supported by the indomitable energy and irrepressible enterprise of our agricultural and industrial interests, and an intelligent, prosperous and sometimes a riotous

labor field—with all of these great forces combined, connected with the active and sympathetic co-operation of the Secretary of Commerce and the National Association of Manufacturers, it is safe to predict that in another generation the United States will be the industrial and financial power of the world."

John Kirby, of Dayton, presented a paper on the Citizens' Industrial Association, and C. N. Fay, of Chicago, followed with a paper on "Strike Insurance." He advocated the establishment of a strike insurance department by the association, each of the members being assessed for the maintenance of the fund, so that in case of labor troubles at any of the plants of the members, they can be assured against financial loss. He advocated the policy of shutting down a plant in time of labor troubles and only resuming operations after the trouble has passed over. Action on the suggestions was deferred.

On Tuesday evening a reception and ball was held in the Hotel Schenley. Business sessions will be held Wednesday morning and afternoon, while a carriage ride is provided for the ladies. On Thursday morning Judge Peter J. Grosscup, of Chicago, will deliver an address on "Trusts and National Incorporation." In the afternoon a boat excursion has been planned on the rivers, while the ladies have been invited to visit the factories of the H. J. Heinz Co., in Allegheny.

A partial list of the delegates follows—including particularly representatives of the iron and steel metal trades:

D. M. Parry, Parry Mfg. Co., Indianapolis, Ind.
F. H. Stillman, Watson-Stillman Co., New York.
Marshall Cushing, National Ass'n of Mfrs., New York.
C. A. Carlisle, J. M. Studebaker, J. M. Studebaker, Jr., Studebaker Bros. Mfg. Co., South Bend, Ind.
R. B. Zint, Republic Iron & Steel Co., Chicago, Ill.
H. D. Morton, W. T. Garratt & Co., San Francisco, Cal.
E. F. DuBrul, Miller, DuBrul & Peters Co., Cincinnati, O.
R. Michener, Crucible Steel Co. of America, Pittsburg.
F. W. Gerdes, Hall Steam Pump Co., Pittsburg.
E. F. Hartshorn, Stewart-Hartshorn Co., Newark, N. J.
H. S. Chamberlain, Citico Furnace Co., Chattanooga, Tenn.
James Lappan, James Lappan Mfg. Co., Pittsburg.
J. W. Van Cleave, Bucks Stove & Range Co., St. Louis, Mo.
J. H. McClure, Phillip & Buttoff Mfg. Co., Nashville, Tenn.
John M. Maxwell, Parry Mfg. Co., Indianapolis, Ind.
W. H. McFadden, Joseph Fawell, Mackintosh, Hemphill & Co., Pittsburg.
C. A. Green, R. G. Dun & Co., New York.
Homer J. Lindsay, Carnegie Steel Co., Pittsburg.
A. O. Backert, *The Iron Trade Review*, Pittsburg.
Elbert Walker Shirk, Indiana Mfg. Co., Peru, Ind.
John E. Zimmerman, The American Pulley Co., Philadelphia.
E. M. Allen, Harbison-Walker Refractories Co., Pittsburg.
J. Kirby Jr., The Dayton Mfg. Co., Dayton, O.
A. C. Marshall, Davis Sewing Machine Co., Dayton, O.
Albert J. Logan, A. J. Logan & Co., Pittsburg.
J. A. Jeffrey, Jeffrey Mfg. Co., Columbus, O.
Henry Fairbanks, E. V. T. Fairbanks & Co., St. Johnsbury, Vt.
E. M. Zehnder, Scranton Bolt & Nut Co., Scranton, Pa.
James E. Porter, Firth-Sterling Steel Co., Pittsburg.
L. M. Horton, Scranton Bolt & Nut Co., Scranton, Pa.
B. F. Harper, Carnegie Steel Co., Pittsburg.
J. O. Craig, Riter-Conley Co., Pittsburg.
Thomas H. Smith, Pittsburg Screw & Bolt Co., Pittsburg.
Clayton Mackintosh, National Ass'n of Mfrs., New York.
Frank A. Harber, George W. King, A. E. Cheney, Marion Steam Shovel Co., Marion, O.
J. A. Schroeter, Huber Mfg. Co., Marion, O.
Robert P. Scott, Sinclair-Scott Co., Baltimore.
Morris G. Condon, H. B. Underwood & Co., Philadelphia.
F. S. Kretsinger, Iowa Farming Tool Co., Fort Madison, Iowa.
C. F. Burns, Otto Gas Engine Works, Philadelphia.
William A. Dickey, W. T. Dickey & Sons, Inc., Baltimore.
W. T. Leavenworth, R. Wallace & Sons Mfg. Co., Wallingford, Conn.
Grant McCargo, Pennsylvania Lubricating Co., Pittsburg.
R. C. Kingsley, Carnegie Steel Co., Chicago.
J. J. Satterthwaite, Remington Machine Co., Wilmington.
Daniel Davenport, American Anti-Boycott Ass'n, Bridgeport, Conn.
W. G. Cooper, secretary Atlanta Chamber Commerce, Atlanta, Ga.
W. J. Clark, W. J. Clark Co., Salem, O.
M. E. Barber, Piqua Handle & Mfg. Co., Piqua, O.
George Rollings, Pittsburg Malleable Iron Co., Pittsburg.
A. C. Rosencranz, Vulcan Plow Co., Evansville, Ind.
James Coe, James Coe & Co., Newark, N. J.
N. F. Thomson, Citizens' Alliance, Birmingham, Ala.
V. H. Power, *Manufacturers' Record*, Baltimore.
E. Parmly, Jr., Elliott-Fisher Co., New York.
W. Y. Houghton, Richmond City Mill Works, Richmond, Ind.
Alexander Harvey, Dietrick & Harvey Machine Co., Baltimore.
S. A. Forston, Lombard Iron Works, Augusta, Ga.
W. D. Agerton, Lima Locomotive & Machine Co., Lima, O.
F. William Vogt, Louisville Silvering & Beveling Co., Louisville, Ky.
E. W. Thomas, Roe Stephens Mfg. Co., Detroit, Mich.
H. B. Anthony, McRae & Roberts Co., Detroit, Mich.
C. Gordon Neff, Bradford Belting Co., Cincinnati, O.
E. P. Botsford, Pittsburg Malleable Iron Co., Pittsburg.
F. S. Wernecken, John Brennan & Co., Detroit, Mich.
Julius F. Kurtz, Emerson, Smith & Co., Ltd., Beaver Falls, Pa.
H. A. Lanman, Columbus Bolt Works, Columbus, O.
E. B. Gager, Kinnear & Gager Co., Columbus, O.
J. W. Stevenson, Ayer, Houston & Co., Portland, Me.
Thomas Devlin, Thomas Devlin Mfg. Co., Philadelphia.
George H. Simons, Adriance Platt Co., Poughkeepsie, N. Y.
F. A. Halsey, *American Machinist*, New York.
James A. Robinson, Warren, Webster & Co., Pittsburg.
J. E. Roth, Phillips Mine & Mill Supply Co., Pittsburg.
Enos Paullin, Ferracute Machine Co., Bridgeton, N. J.
A. B. Farquhar, A. B. Farquhar Co., Ltd., York, Pa.
James Inglis, American Blower Co., Detroit, Mich.
C. S. Russell, Parker Russell M. & M. Co., St. Louis, Mo.
W. P. Bickley, H. P. Deuscher Co., Hamilton, O.
Milton Jackson, Miller Lock Co., Philadelphia.
Edward V. McCaffrey, McCaffrey File Co., Philadelphia.
Stephen W. Tener, American Steel & Wire Co., Pittsburg.
E. H. Hargreaves, Cincinnati Tool Co., Cincinnati,
E. H. Ball, Chicago Belting Co., Chicago, Ill.
Adolph Mueller, H. Mueller Mfg. Co., Decatur, Ill.
N. J. Blackeney, Crawford, McGregor & Canby Co., Dayton, O.
Robert Wuest, National Metal Trades Association, Cincinnati.
George V. Milliken, Pittsburg Mfg. Co., Pittsburg.
Isaac W. Frank, United Engineering & Foundry Co., Pittsburg.
W. M. Evered, National Iron Co., Duluth, Minn.
F. R. Jackes, Jackes-Evans Mfg. Co., St. Louis, Mo.
J. S. Skinner, C. S. Atkinson & Co., New York.
H. A. Reed, Baird Machinery Co., Pittsburg.
R. B. Carr, J. W. Brainerd, Carnegie Steel Co., Pittsburg.
H. M. Kinney, Winona Wagon Co., Winona, Miss.
L. Moulthorp, New Haven Mfg. Co., New Haven, Conn.
E. C. Spear, Cheney-Bigelow Wire Works, Springfield, Mass.
N. A. Bendel, Carnegie Steel Co., Pittsburg.
P. B. Kendig, Seneca Falls Mfg. Co., Seneca Falls, N. Y.
J. N. Wiggin, H. B. Wiggin's Sons Co., Bloomfield, N. J.
J. Shepherd Clarke, J. Shepherd Clarke Co., New York.
A. T. Simonds, Simonds Mfg. Co., Fitchburg, Mass.
F. E. Myers, F. E. Myers & Bro., Ashland, O.
C. S. Swann, Western Gas Construction Co., Fort Wayne, Ind.
C. F. Quincy, Railway Appliance Co., Chicago.
D. E. Clapp, E. D. Clapp Mfg. Co., Auburn, N. Y.
C. H. Bond, Scranton Forging Co., Scranton, Pa.
C. A. Chase, Syracuse Chilled Plow Co., Syracuse.
F. B. Black, Ohio Brass Co., Mansfield, O.
Wm. L. Hurd, Monongahela Tube Co., Pittsburg.
S. A. Stewart, S. A. Stewart, Pittsburg.
Geo. R. Lamb, Waterbury Farrel Fdy. & Mach. Co., Waterbury, Ct.
David Hunt, Jr., Warner & Swasey Co., Cleveland.
Glenn C. Webster, Sterling Electrical Mfg. Co., Warren, O.
Rowland S. Wilson, Reineke, Wilson Co., Pittsburg.
Wm. Harris, Bessemer Coke Co., Pittsburg.
Edward King, Pennsylvania Engineering Works, New Castle, Pa.
W. F. Schleiter, Dilworth, Porter & Co., Pittsburg.
A. W. Crouse, Petroleum Iron Works Co., Washington, Pa.
Roscoe T. McCormick, Petroleum Iron Works Co., Pittsburg.
Joseph W. Marsh, Standard Underground Cable Co., Pittsburg.
Louis Lefi, Macomber & Whyte Rope Co., Chicago.
W. C. Scott, Thomas Carlin Sons Co., Allegheny, Pa.
D. M. Osborne, C. H. Dutton Co., Kalamazoo, Mich.
J. F. Druckmiller, Harold C. Parsons, Employers' Association, Akron, O.
Robert A. Bole, Manning, Maxwell & Moore, New York.
Robert Geddis, Jones & Laughlin Steel Co., Pittsburg.
T. K. Foote, Bridgeport Chain Co., Bridgeport, Conn.
George V. Wilson, Hussey-Bins Shovel Co., Pittsburg.
Charles J. Graham, Graham Nut Co., Pittsburg.
Robert A. Bruce, Carnegie Steel Co., Pittsburg.
Wm. L. Deming, Deming Co., Salem, O.
Alfred H. Hicks, Allegheny Steel & Foundry Co., Pittsburg.
O. H. Bateman, Anchor Nail & Tack Works, Pittsburg.
L. H. Jones, Detroit Copper & Brass Mills, Detroit, Mich.
George T. Coppins, Walworth Mfg. Co., Boston, Mass.
George H. Barbour, Michigan Stove Co., Detroit, Mich.
N. G. Williams, Vermont Farm Machine Co., Bellows Falls, Vt.
A. F. Hegewald, Chas. Hegewald Co., New Albany, Ind.
W. T. Plummer, Main Belting Co., Philadelphia.
James A. Howarth, Hoggson & Rellis Mfg. Co., New Haven, Conn.
F. J. Stephenson, Knoxville Iron Co., Knoxville, Tenn.
E. R. Bailey, Grasselli Chemical Co., Cleveland.
Theodore Armstrong, Pennsylvania Salt Mfg. Co., Philadelphia.
Thos. P. Eagan, J. A. Fay & Eagan Co., Cincinnati, O.
Fredk. W. Sivyer, Northwestern Malleable Iron Co., Milwaukee.
Geo. M. Misner, Contractors' Plant Mfg. Co., Buffalo.
Frederick J. Brown, Benedict & Burnham Mfg. Co., Waterbury, Conn.
D. J. Toothill, Lanyon Zinc Co., St. Louis, Mo.
W. D. Dunning, Alexandria Iron Works, Syracuse, N. Y.
A. Rosner, Standard Gauge Steel Co., Beaver Falls, Pa.
Thomas S. Laughlin, Thomas Laughlin Co., Portland, Me.
William Butterworth, Deere & Co., Moline Ill.
J. S. Hazelton, Rome Brass & Copper Co., Rome, N. Y.
W. B. Johnson, Rome Mfg. Co., Rome, N. Y.
Frank B. Gill, Standard Scale & Supply Co., Pittsburg.
W. A. Winn, Morgan Construction Co., Worcester, Mass.
J. F. Vogel, Gendron Wheel Co., Toledo, O.
Elmer Harold, Crescent Machine Co., Leetonia, O.
Jacob Detwiler, Herbrand Co., Fremont, O.
Henry B. Lupton, Oliver Iron & Steel Co., Pittsburg.
John W. Nesmith, Colorado Iron Works, Denver, Colo.
James P. Evans, Colorado Iron Works, Denver, Colo.
Charles C. Emmons, Standard Sewing Machine Co., Cleveland.
Richard C. Jenkinson, R. C. Jenkinson & Co., Newark, N. J.
F. Rees Phillips, J. W. Paxson Co., Philadelphia.
Charles A. Wolfe, Baird Machinery Co., Pittsburg.
E. P. Gesdon, Erie City Iron Works, Erie, Pa.
Geo. M. Cooper, Manufacturers' Association, Pittsburg.
D. W. Dick, Carnegie Steel Co., Pittsburg.
J. L. Record, Minneapolis Steel & Machine Co., Minneapolis.
T. J. Gillespie, Lockhart Iron & Steel Co., Pittsburg.
J. G. Battelle, Lookout Mountain Iron Co., Battelle, Ala.
E. T. Betts, Betts Machine Co., Wilmington, Del.
B. F. Boyts, Boyts-Porter Co., Connellsville, Pa.
Augustus Trump, Pittsburg Steel Foundry, Pittsburg.
B. F. Kraffert, Titusville Iron Co., Titusville, Pa.
W. B. Klee, Damascus Bronze Co., Pittsburg.
L. N. McCarter, R. S. Newbold & Son Co., Norristown, Pa.

American Society for Testing Materials.

In connection with the announcement of the seventh annual meeting of the American Society for Testing Materials, at Atlantic City, N. J., June 16, 17 and 18, the report of the committee on nominations is presented. It names for president Charles B. Dudley; for vice president, R. W. Lesley; for secretary-treasurer, Edgar Marburg; and for member of the executive committee, James Christie. The headquarters for the coming meeting will be at the Hotel Traymore. An elaborate program is under preparation for this meeting, provision being made for every important interest represented in the society.

The E. J. Moore Machine & Foundry Co., Philadelphia, has made an assignment. It is said that the liabilities will not exceed $16,000 and that the assets may be above that amount.

Annual Address of President Parry.*

As the paramount question with the association and with manufacturers and employers generally has for some time been that of lawless and socialistic unionism that subject necessarily demands our first attention. Many events have transpired in the industrial strife waged by organized labor since our convention at New Orleans. But of the several thousand strikes, and the accompanying scenes of riot and assault, that have made the labor record the worst in many years, I will say but little. No general strike occurred such as that in the anthracite fields of the year before, but local strikes were almost without number and the results were deplorable. In some of the industrial centers there was serious paralysis of business for more or less extended periods, while in at least one state, that of Colorado, semi-war with militant socialism has prevailed for months. It seems as though the success scored in the anthracite strike fired the minds of labor leaders everywhere with an exalted idea of the power they possessed. Their theory that the condition of labor can be bettered by checking production and making life and property insecure was put to an extensive test, but the results I am confident have been most disappointing to the advocates of such views. There are many indications which go to show that organized labor is learning a very valuable lesson in economics and law observance, and hopes can be reasonably entertained that the strife which has characterized the last year will be less strenuous in the future.

Cost of Diminished Production.

The losses arising from the strikes of last year are almost beyond calculation. Some idea of their extraordinary size can be formed when it is considered that good authorities estimate that building operations were prevented, amounting to $100,000,000 in two of our leading cities alone. A man must be exceedingly dull of comprehension who cannot see that the wasted labor of thousands of men and the enforced idleness of millions of productive capital must mean a great loss in national wealth. This loss must be borne by all classes. Labor cannot hope to escape its share of the burden. The condition of no class of the people is to be bettered by methods which tend to the impoverishment of the country.

The causes of periods of industrial depression have long been speculated upon by economic thinkers but what simpler proposition is there than this, that if the production of a nation is curtailed there is certain to be a diminishing share of the comforts and necessities of life going to each individual If the normal product of the country because of the refusal of men to work is reduced say half a billion dollars in any one year it should not ocasion any surprise to find prosperous conditions disappear. I do not know how great is the loss to be charged up to labor strife for the past year, but I am confident that the recession to be noted in industrial activity is to be traced more to this strife than to all other causes combined.

The manufacturers and employers do not desire this strife, and labor should not seek it. It seems repugnant to our ideas of twentieth century civilization to fight out this question in the gladiatorial arena. Surely any cause with right upon its side need not fear an appeal to the conscience and intelligence of the American people. To defy government and to trample upon the rights of others is to confess to being in the wrong. It likewise bears a near resemblance to anarchy and rebellion.

Employers Not for War.

It is absurd to charge the manufacturers and employers of this country with desiring war with their employes. If there is anything which the manufacturers as a class desire more in the gladiatorial arena. Surely any cause with right upon men. What's more, the average employer will yield a good deal in order to have such employes. But he is not going to yield his right to run his own business, and he would be a poor specimen of an American citizen if he did yield that right. It is also absurd to charge the manufacturers and employers with combining for the purpose of reducing wages and otherwise oppressing their employes. Of all the associations of employers in this country I know of not a single one that has for its object the oppressing of the employe. There has not been any concerted effort to force a reduction of wages and I do not believe there will ever be such an effort. There are some associations of employers, particularly among the trade associations, that are continually struggling against exorbitant demands of the unions, but these associations are constantly on the defensive and their efforts to retain some fair share of the profits in their business are not to be construed as efforts to oppress their labor.

In regard to the National Association of Manufacturers I am positive that any crusade having for its object the grinding down of labor would meet with the determined opposition of practically the entire membership. The policy of this association is primarily one of peace. If we stand for anything we stand for the development of American industry. It is obvious that men will hesitate to invest their capital in productive enterprises if it means constant struggle with labor unions, and if frequent strikes tend to destroy trade by making uncertain the filling of contracts. Industrial strife adds a hazard to investments involving the employment of labor which cannot fail to be injurious to industrial development, thus causing permanent loss to all classes. Therefore our policy is one which looks to the maintenance of peace, and not to the adoption of measures that will arouse hostilities.

But while we are for peace we cannot afford to purchase peace by the surrender of constitutional rights. Our policy is not one of aggression, but one of defense. We are not looking for strife and we wish to avoid strife, but if strife is forced upon us by organized labor we cannot be expected to hand over our profits and the management of our affairs in order to have peace. The only alternative left is to resist the encroachments upon our rights of property, and surely a reasonable public will not construe our efforts of defense as being inspired by a desire to oppress labor.

High wages are a blessing, not a curse. Where is there an employer who would not prefer seeing his men highly paid to seeing them struggling for a mere livelihood? But some men preach to labor that the employer is a supernatural being capable of creating wealth out of nothing and therefore able to pay his men whatever he pleases, and they picture him as an ogre refusing to satisfy the craving for better wages on the part of his employes when he could as easily as not grant their requests. The notion that the employer can fix wages to suit himself lies at the root of most labor disputes. The leaders of organized labor encourage this belief and inflame the minds of their followers by its iteration until the men are ready for desperate deeds to force the employer to raise their pay. But the truth is, and labor must learn this truth, that neither the employer nor the employe can, beyond a very limited degree, affect the rate of wages either one way or the other.

The Problem Turns on Increasing Production.

The rate of wages in any country is dependent upon the per capita production. If the average amount of product turned out by each man is large, then wages will be high, and vice versa. This is a mere truism, but some are slow to recognize the truth when it does not coincide with their desires. Men labor for commodities, for the necessities and comforts of life, and not for money. All the money in the world will not support life the fraction of a second. It is merely a medium of exchange. What men really desire and must have are the products of labor. Now the products of labor, with the exception of machinery, buildings, etc., which are necessary to assist labor in further production, must all be distributed. The grain, the shoes, the clothing, the furniture, the books, etc., cannot be stored in warehouses and hoarded up from year to year but must be disposed of, if not for one price then for another. The greater the quantity of the things produced which support life and contribute to the pleasure of existence the greater the amount which each individual is bound to receive, in other words, the greater will be his real wages. Therefore the one way and the only way to raise wages is to increase the per capita production.

How then can the per capita production be increased? This is the first and greatest question of civilization. There are ways in which it can be solved, but these ways though sure are slow. That there is no royal road to wealth is particularly true of humanity as a whole. The panacea of organized labor to create wealth by fiat is child-like in its absurdity. Man-

*Extracts from the annual address of D. M. Parry, president, before the National Association of Manufacturers, at Pittsburg, May 17, 1904.

kind cannot emancipate itself from drudgery by the get-rich-quick schemes proposed by labor. The principal way to enrich the human race is to increase the amount of machinery, that is, the amount of productive capital. Who owns this productive capital is really quite immaterial. The material point is that it be increased, and no system could be devised that will more surely result in its being increased than that of individual ownership.

Another way to increase the per capita production is through education and training of the individual to the end that he may become more efficient as a wealth producer. Hence the need for industrial schools.

This brings up the question of relative wages received by different classes, and on this point I would say that the intelligence and efficiency of the various classes of labor is a strong factor in determining their relative wages. But it must be acknowledged that it is not the fault of the employer that there are certain classes of cheap labor. The mere fact that cheap labor exists shows that it is unprofitable to employ it, but if some enterprising man finds by close figuring he can make a profit by employing it, is he to be looked upon as an enemy of labor? Is he to be stopped in his efforts to make this labor productive by the fixing of arbitrary wage scales by labor unions? I believe that it is better for men to work for something than not to work at all, and the man who finds employment for cheap labor is really a benefactor of his kind. The principle underlying the regulation of wages, if I may be pardoned for presuming to define a general economic truth, may, I believe, be roughly stated as follows:

The general rate of wages cannot fall below what is absolutely necessary to support life and cannot exceed an amount determined by the per capita production. Relative rates of wages are determined by the relative value of the services rendered to the common good by different individuals.

It is not my purpose to enter into a long discussion of the labor question, but I deemed it appropriate that I should answer the charge that the manufacturers and employers are combining to grind down wages and are seeking to stir up industrial strife. It is not out of place for me also, I believe, to show that wages cannot be raised, metaphorically speaking, either at the point of a gun, by legislation, by the decisions of arbitration courts or by the mandates of labor unions. The cause of labor is not to be advanced by physical strife, by the monopolization of employment by unions, by restricting the number of apprentices, by striving to bring about socialism, anarchy and the confiscation of wealth, by seeking arbitrarily to limit the hours of labor and to fix wages despite the operation of laws that are beyond the power of men to alter, or by other devices or efforts on the part of organized labor which tend to reduce the per capita production, to put life and property in jeopardy and to destroy individual enterprise and American freedom.

Fruits of Employers' United Efforts.

At the time of the Indianapolis convention of this association I remember that many of us regarded it as a foregone conclusion that the eight-hour bill would be passed by Congress, and at the New Orleans convention last year the general voice of the country seemed to uphold organized labor even in its most extreme positions. Such was the influence of organized labor at one time that it seemed that only the legislative formalities had to be complied with in order to inaugurate the socialistic era by the passage of the eight-hour and other measures, when it appeared that the principle of government arbitration had been firmly established and that conditions were ripe for the forced recognition of the closed shop in all industries. That to my mind was a very critical period in the history of the country. A few more years of this socialistic tendency and an attempt to re-establish free industrial conditions would most likely have meant a very serious struggle. It is only necessary to point to the organize labor government of Australia and the domination of British industry by trades unionism in order to show what might have happened in this country. But fortunately for the welfare of this nation there existed this great association of manufacturers. Courageously grappling with the emergency, it at last succeeded in arousing the country on this great question. Before organized labor could become intrenched behind the universal closed shop, the government arbitration tribunal and socialistic enactments by Congress, it was given a check from which it will never recover. The battle still goes on, but there are many signs that the cause we stand for is certain of complete victory and that at no distant day. Organized labor as we now know it has passed the acme of its power, and it must either radically alter its methods and theories or suffered dissolution.

The protest against socialistic and lawless unionism made by this association at New Orleans last year had a very salutary and far-reaching effect. The people listened to this protest and from that time to this public sentiment has been setting in strongly against union methods. Not only that but the action taken by this association gave encouragement to employers all over the country. Organization became their watchword, and to-day we find associations of employers in practically every large city and in scores of smaller ones. In this general work of organization this association I am glad to say has done its part.

With the more thorough organization of employers and more extensive propaganda work the cause of industrial freedom has made sure and lasting progress. Strike after strike has been lost by the unions, and though the militia was called out in some places and anarchy seemed to prevail for a time in others yet the supremacy of the law has been better upheld than in previous years. There have been such things as indictments returned by grand juries against strikers for assaults, and fines have actually been levied against others. A number of suits are pending in different parts of the country for personal and property damages against strikers, and there have been some notable court decisions in regard to the boycott. The contest has been waged extensively all along the line. In Congress the labor lobby has not succeeded in getting its bills out of the hands of the committees, while the civil service regulations have been upheld by the president as against the closed shop law of organized labor. The year has been crowded with notable events in regard to the labor question, but none was so important perhaps as the order of President Roosevelt reinstating W. A. Miller in the government printing office after he had been discharged because he had been expelled from the union. The president at that time laid down the principle that the closed shop could not apply in the government service.

The American Federation of Labor at its annual convention in Boston last winter declared unequivocally that the closed shop must be established in all industries. But the tendency has been strongly the other way. Large numbers of employers who had been running closed shops have declared their shops open, and many strikes for the establishment of the closed shop have been lost. The closed shop is against public policy and is of doubtful legality. The liberty of the individual would be impossible if he is to be debarred from the right to contract for his services because of his not belonging to a union. I believe that this truth will become generally recognized and that the day must come when no industry will be allowed to run on the closed shop plan. Any set of men have the right to contract in a collective capacity for the sale of their labor, but they cannot be upheld in making contracts which exclude other labor from the right to contract.

The change in the general tone of the press is indicative of the trend of events. In the place of open support of the unions we now find that the majority of the papers handle the labor question with exceeding caution as though it were a two-edged sword. But it is with great pleasure I am able to state that a number of the leading journals of the country have come out boldly against the presumptous acts of unionism.

[The address then goes at length into the organization of the Citizens' Industrial Association of America and suggested that this organization and the National Association of Manufacturers enter into close affiliation, thus avoiding duplication of work. It is suggested that the executive committee invite the Citizens' Industrial Alliance at its convention at New York in November to appoint a conference committee to take up this subject.]

While the organization of employers in other lines has been successfully prosecuted all over the country I am also very pleased to say that this association has added another thousand

members to its rolls in the last year, bringing the total up to approximately 3,000. The Citizens' Industrial movement has assisted and not retarded the growth of this organization. We now have the most magnificent organization of its kind in the world, an organization strong in resources and in membership, an organization which is practically an insurance against populistic and socialistic experiments in government and which pays the highest dividends in the results it accomplishes for the advancement of the industrial welfare. The members of this organization have every reason to be proud of their affiliation with such an association, and I deem it to be their duty as well as the duty of those manufacturers who have not yet become members to stand by this association and contribute to its maintenance.

Legislation at Washington.

Pending legislation inimical to industrial interests made very little progress toward passage at the recent session of Congress. The bills against which our objections were centered were the anti-injunction bill, which proposes to strip the federal courts of the power to issue legal process for the protection of property and constitutional rights in times of labor disturbance; the eight-hour bill, which proposes interference by the government with the right of men to work as many hours as they please and which would cause the public funds to be used for the payment of higher prices for contract work than private corporations would have to pay; and the national arbitration bill, which proposes to establish a national tribunal of arbitration and inquisition into the affairs of private industry. The bill providing for the introduction of the metric system in this country has also received a large amount of attention by this association.

Many hearings were given during the session by the congressional committees having charge of these bills and especially by those committees handling the anti-injunction and eight-hour bills. I have here to acknowledge the hearty co-operation of all the employers' associations of the country in the prosecution of the campaign waged against these two bills. The allied organizations of the Citizens' Industrial Association in particular rendered very effective assistance. I think it proper to cite as an instance of this the work that was done in regard to the anti-injunction bill. During the month of January information was received that in a few days the Committee on Judiciary in the House would give consideration to that bill and it was also said that the intention was to report the measure to the House without further delay. Believing that measures like this should be opposed from the start, and that it was not good policy to wait until they reached the Senate before beginning our efforts against them, word was sent to all the associations of the country; and in consequence of the requests made by them the House committee consented to the setting of dates for hearings a month ahead. Ample time was thus secured for the employers to present their side of the issue, and a large number of representatives of various associations appeared at the hearings given during the months of February and March. The fight against the bill was confined to this one committee and the reports of the hearings make a valuable public document.

The campaign against the eight-hour bill had to be carried on before both House and Senate committees having this measure in charge. Because the claim is made that the eight-hour bill is a humanitarian measure it appears to be more difficult to defeat than the anti-injunction bill. But much headway was made in showing that the bill is radically wrong in principle and would be injurious to the interests of labor itself were it enacted into law.

Moving pictures, showing interior and exterior views of the Westinghouse plants both in the United States and abroad will be shown in the Westinghouse auditorium at the World's Fair at St. Louis. These pictures were exhibited in Pittsburg last week and attracted much attention. Many of the interior views were made possible by the use of the Cooper-Hewitt lamp.

The Canton Steel Ceiling & Mfg. Co., recently incorporated, is allied with the Canton Steel Roofing Co., and will handle the Canton steel ceiling manufactured by the latter.

NEW ENGLAND FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the New England Foundrymen's Association was held at Providence, R. I., on Wednesday, May 11. The members met at the Union Station, Providence, at 2 o'clock, and thence the assemblage turned to its objective point, the foundry of the Brown & Sharpe Mfg. Co., which was soon reached. This shop is far famed for its completeness and modern equipment, with all manner of conveniences provided for the workmen, with molding carried out on smooth concrete floors, and iron carried about by trolley systems. Nevertheless the visitors were astonished to see the actual extent to which these labor saving appliances and economizing improvements were provided. Men were stationed at intervals to give proper direction to the party and explanations were given by the staff of the establishment which aided to a thorough understanding of the systems of work involved.

After a complete inspection of the foundry had been made the visitors took carriages which had been provided by the committee for a drive to the principal points of interest in Providence and through the delightful park system which has all the elements of country and park delightfully combined. The trip was a most agreeable one, the many turns and varied scenery contributing to the pleasure of those participating.

The meeting was held at the Wellington, where dinner was served, after which came the business session. Applications for membership were received from the following: Stanley Works, Bridgewater, Mass.; Pilling & Crane, Boston; Boston Fire Brick Co., Boston; J. A. Colvin, Worcester, Mass. They were unanimously elected to membership.

H. A. Carpenter reported on the foundry exhibit building at the St. Louis Exposition and the report was accepted as final. It was to the effect that the exposition authorities had assumed all responsibility for the erection and maintenance of this building.

Announcement was made that the next meeting would be held on June 8, at Boston, and that arrangements had been made with Mr. O. P. Briggs, commissioner of the National Founders' Association, to address the association on the "Apprentice Question as Related to the Foundry Business."

President Shaw then introduced Henry A. Carpenter, ex-president of the N. E. F. A., as toastmaster of the evening and his advent was greeted with applause whose heartiness gave emphatic evidence of his popularity. He extended greetings to those present on behalf of the Providence members of the association. Mr. Carpenter then presented to President Shaw the beautiful gavel which the former had received as representative of the New England Foundrymen's Association at the Philadelphia Foundrymen's Association dinner, at Philadelphia on May 4, given to Pittsburg and New England associations. The speaker referred to the address of Dr. Brown, of the Philadelphia Association, who presented the gavel to Mr. Carpenter, and read an abstract from his speech as follows:

"The wood that caps this beautiful gavel, we are told, was secured while overhauling the United States frigate Constitution—"Old Ironsides," and so named in consequence of being but slightly injured in battle with the Guerriere. She was built in Boston by Caghorn & Hartley, costing $302,719, and was launched on Sept. 20, 1797. She carried 44 guns and was of 1,576 tons burden. She is now fixed in Boston Harbor. As Commodore Talbot's flagship, she was engaged in the French war in 1800 and as Commodore Preble's flagship she was used against the pirates in the Mediterranean in 1803 and did good service. Under Capt. Hull, in 1811 and 1812, she sent a frigate to the bottom, the Guerriere, and the Java, under Baimbridge's command, and took all on board prisoners into Boston. The Constitution was taken into Boston for repairs, but in consequence of the port being blockaded, did not get out until New Year's Day, 1814. She was then under command of Capt. Chas. Stewart, who captured the frigate Cyane and sloop-of-war Levant, also four prizes. That about ended her fighting days, but the most important part comes now: In 1830 she was condemned as unseaworthy and to be broken up, but other counsel prevailed and she was ordered rebuilt in 1833. At that time Dr. Brown was picking up kindling wood

from the historic ship and saved the pieces that cap this highly prized souvenir."

President Shaw responded in a very pleasing manner, accepting the historic gift on behalf of the association. The secretary was instructed to send a letter of thanks to the Philadelphia Foundrymen's Association for the beautiful gavel, also for the invitation extended to the New England association to attend the recent reception and dinner.

A report of progress was received from the committee on arrangements for transportation to the American Foundrymen's Association convention to be held at Indianapolis in June.

The toastmaster then introduced Hon. George H. Utter, lieutenant governor of Rhode Island. He extended greetings to those present on behalf of the State and was frequently applauded. The most prolonged demonstration of the night was when the speaker made reference to the settlement of the coal strike in which President Roosevelt figured conspicuously.

At the conclusion of the address the toastmaster introduced Hon. George A. Littlefield. He extended congratulations on the position of the industry represented and commented on organizations, among employers, finding much to commend in such an organization as the New England Foundrymen's Association.

The toastmaster, who had displayed a most happy faculty in his introductory remarks, entertained the members with a number of humorous stories, some of which emanated from the reception held at Philadelphia.

On motion a vote of thanks was extended to the Providence members and the Brown & Sharpe Mfg. Co. for the delightful program provided, also to the speakers of the evening. It was the feeling of the visitors that the day had contained about the maximum of enjoyable events it could well carry. New acquaintances were formed and new connections made, and much information in the interest of the trade interchanged. Following is a list of those in attendance:

Hon. Geo. H. Utter, lieut. governor of Rhode Island.
Hon. Geo. A. Littlefield, Providence, R. I.
Bartlett M. Shaw, Walker & Pratt Mfg. Co.
A. J. Miller, Jr., Whitehead Bros.
H. J. Burrough, Builders' Iron Foundry.
Fred F. Stockwell, Barbour-Stockwell Co.
Wm. H. Stafford, Gibby Foundry Co.
Henry A. Carpenter, A. Carpenter & Sons Foundry Co.
J. W. Burch, Pratt & Cady Co.
Theo. M. Lincoln, Hartford Foundry Corporation.
Chas. F. Belcher, Walker & Pratt Mfg. Co.
Robt. Blythe, Walker & Pratt Mfg. Co.
Harry E. Gibby, Mechanics' Foundry Co.
G. H. Carson, Mechanics' Foundry Co.
John W. Farrar, G. W. & F. Smith Iron Co.
W. H. Coffin, Springfield Facing Co.
L. S. Brown, Springfield Facing Co.
Wm. C. Doherty, Doherty Bros.
H. E. Wetherbee, Jas Hunter Machine Co.
James A. Pevey, Pevey Bros.
Franklin S. Pevey, Pevey Bros.
J. M. Bense, Kinsley Iron & Machine Co.
W. H. Bense, Kinsley Iron & Machine Co.
E. R. Knapp, Geo. W. Stafford Co.
A. W. Chase, Kinsley Iron & Machine Co.
H. W. Cutter, Waltham Foundry Co.
C. H. Colvin, C. T. Colvin, Theo. H. Colvin, Colvin Foundry Co.
J. G. Aldrich, New England Butt Co.
J. F. Blauvelt, New England Butt Co.
C. C. Cowall, Atwood Morrison Co.
C. A. Reed, N. S. Bartlett & Co.
E. P. Osgood, Osgood & Witherly.
F. B. Witherly, Osgood & Witherly.
A. E. Shields, Shields Foundry Co.
G. C. Shields, Shields Foundry Co.
Patrick Shields, Shields Foundry Co.
F. J. Stewart, Jas. Stewart & Co.
B. C. Sandpaugh, Victor Metals Co.
A. L. Goodnow, L. H. Goodnow Foundry Co.
E. A. Tutein, Crocker Bros.
Alva Carpenter, A. Carpenter & Sons Foundry Co.
O. C. Barrows, A. Carpenter & Sons Foundry Co.
E. B. Pierce, Wheeler Foundry Co.
D. F. Eagan, H. E. Pridmore Co.
E. J. Lyon, Brown & Sharpe Mfg. Co.
J. Morpett, Brown & Sharpe Mfg. Co.
T. R. Scott, Brown & Sharpe Mfg. Co.
G. H. Lincoln, Geo. H. Lincoln & Co.
F. G. Scholfield, Kabley Foundry Co.
W. M. Saunders, Saunders & Franklin.
F. H. Franklin, Saunders & Frankiln.
C. F. Butterworth, J. S. White Co.
C. Hitch, Jr., American Tool & Machine Co.
A. F. Hammett, F. D. Moffat & Co.
H. L. Lovejoy, Becker-Brainard Milling Mach. Co.
J. Connolly, S. K. Lovewell & Co.
Geo. V. Rogers, Holmes & Blanchard Co.
L. A. Colvin, Worcester, Mass.
M. J. Perault, Fitchburg, Mass.
E. H. Colvin, Providence, R. I.
F. W. Blanchard, Cutter, Wood & Stevens Co.
W. T. Nicholson, Cutter, Wood & Stevens Co.
C. H. Joslyn, Merrimac Iron Foundry.
G. W. Hamblet, Hamblet Machine Co.
C. L. Nutter, Old Colony Foundry Co.
James Bowen, Builders' Iron Foundry.
E. V. Hazard, Old Colony Foundry Co.
D. L. Moody, Rogers, Brown & Co.
Morris L. Gay, Rogers, Brown & Co.
Wm. F. White, Dighton Furnace Co.
Geo. P. Sawyer, Hartford Labratory Co.
F. P. Lemard, Dighton Furnace Co.
C. E. Evans, Evans Stamping & Plating Co.
R. W. Whitmarsh, O. G. Thomas Co.
A. Otis Smith, Smith & Wallace.
Geo. O. Sawyer, Hartford Laboratory Co.
W. C. Skulley, Smith & Anthony.
W. F. Savage, Smith & Anthony.
C. H. Rollins, Smith & Anthony.
Rufus K. Jordan, Westbrook, Me.
W. W. Bird, Worcester, Mass.
R. C. Bird, Broadway Iron Foundry.
G. S. Bullock, Whitehead Bros.
Fred W. Dixon, Taunton, Mass.
J. C. Wheeler, Springfield, Mass.
Geo. H. Baush, Baush Machine Tool Co.

STOVE MANUFACTURERS' ASSOCIATION.

The 33d annual meeting of the National Association of Stove Manufacturers was held at the Waldorf-Astoria, New York, on May 11 and 12. The attendance was large and representative. Always a feature, the president's address this year was of unusual interest, in view of the changes that have come over the face of stove manufacture, as of all other industries, in the past year. Henry Cribben, for 53 years connected with the stove trade, was the retiring president. His address referred to the past year as a fair one in the stove industry, though the high point in prices had been reached. He advised against any hasty action in the direction of reducing the selling price. "When we closed our books at the end of the year 1903 we found it was with greatly reduced profits, as compared with the year 1902, caused largely by the increased cost of production and the charging off of the difference in the price paid for the material contained in the stoves carried over in our warehouses and in the pig iron yard to equal the present market price of pig iron. We also found our customers had for some time previous been under greater caution in the purchase of their goods during the latter part of the year, barely ordering what their trade required from week to week. The signs point to a more careful ordering of goods for the year 1904. The cost of our production for 1904 will be about the same as that of 1903, less the difference in price of pig iron and steel, which is somewhat lower than last year; but all other fixed charges are the same as heretofore. Therefore, when the difference in the price of pig iron and steel alone is considered, there is very little room for much or any reduction in the selling price of our goods. It is very much easier for the members of this association to reduce their selling prices than it is to advance them; therefore, it becomes our duty to maintain as fair profitable selling prices for the future as well, at least, as we have done during the past five years, through the efforts and co-operation of the local district associations."

One of the topics discussed by the convention was "Cast Iron Ranges vs. Sheet Steel Ranges." There was not a little opposition to the manufacture of steel ranges, partly because it reduced foundry output and partly because steel ranges were not considered so durable. It was agreed that steel had been making inroads upon cast iron and in this connection it was argued that the manufacturer should supply what the consumer wanted. The making of cheap steel ranges was an evil complained of, but there was no practical suggestion of a cure.

The following officers were elected: President, Peter A. Acker, New York; vice presidents, W. G. Henry, Chicago, Walter P. Warren, Troy, N. Y.; treasurer, Lewis Moore, Joliet, Ill.; general secretary, Thomas J. Hogan, Chicago; board of managers, Ralph S. Buck, St. Louis; Arthur H. Walker, Boston; C. A. Du Charme, Detroit; Edward Bowditch, Albany, N. Y.

The Stove Founders' National Defense Association elected officers as follows: President, Chauncey H. Castle, Quincy, Ill.; vice president, Henry Cribben, Chicago; secretary, Thos. J. Hogan, Chicago; treasurer, Abram C. Mott, Philadelphia.

The Struthers Furnace Co. held its annual meeting on May 18 at its offices in Cleveland and re-elected the following officers: W. C. Runyon, president; J. B. Stubbs, vice president; Albert Grossman, treasurer; Geo. Fairbank, secretary; S. A. Richards, manager.

The Labor Situation.

THE TIE-UP ON THE LAKES.

The action of the Masters' and Pilots' Association in rejecting, by almost unanimous vote, the agreement voted for by every member of the executive committee of captains and mates as well as by the vesselmen on the conference committee, came as a great surprise to the representatives of the carriers who served on the committee. The captains and mates not only voted for last year's scale of wages but agreed to use their influence to have the lodges vote for its adoption. The committee had hardly adjourned, however, when at least one member of the committee was persuaded to recommend to the lodges that they vote against the ratification of the agreement. The only excuse which has been given for their sudden change of position is that the mates, who are paid by the month, were dissatisfied. The opposition to the agreement seems to come, to a very large extent, from the mates, who insist that their rights were not protected by the joint committee. President Livingstone, of the Lake Carriers' Association, has issued the following official statement which is valuable for the light it throws upon union methods, even those of the unions that are on a conference footing with employers' organizations:

"After having been in session at Cleveland about four weeks, during which time we have met six labor organizations, and have completed satisfactory contracts with five—namely, the Scoopers' Union, the Marine Firemen, Oilers' and Water Tenders' Union, the Lake Seamen's Union, and the Marine Engineers' Association. These five organizations have met us in a spirit of fairness, recognized the conditions of the times, and have been satisfied to accept some reductions and modifications from last year's contracts. The sixth one of these unions, the Masters' and Pilots' Association, after several sessions, is the only one that has not been willing to recognize the existing business conditions, but have insisted upon a material advance in wages over last year, with more stringent conditions. We spent several days in session with them, and last Monday, the 9th, we met them on all the conditions except the wage scale. We went over this particular point at great length, and explained to their committee that the business conditions did not warrant any increase in wages; that the operating costs of boats had been advancing every year, until today the vessel owner was confronted with the highest operating expenses on record, with a very dull season ahead and a corresponding reduction in gross earnings, and that we could not possibly entertain any proposition that would further increase our already too high operating expenses, and were even warranted in asking for a reduction, instead of granting an increase. They seemed to be unwilling to recognize the necessity of reducing wages, and a compromise was agreed on binding all members of the association this year to pay last year's lake carriers' wages. The advisory board of the Masters' and Pilots' Association unanimously agreed that this was fair, and that they would go back to their different lodges or harbors and use every effort to have it accepted.

"We naturally expected that as the different lodges or harbors had selected this advisory council to represent them, that upon their return with what they had agreed with the Lake Carriers' Association was a fair proposition to recommend it would be accepted by the main body. It seems, however, as though their call for the special meeting to ratify the action of the advisory council was not couched in such conciliatory language as would bring about such results, as is evidenced by the following postal card sent out, calling the meeting in Chicago:

"'American Association of Masters and Pilots of Steam Vessels.

"'Chicago, May 10, 1904.

"'Dear Sir and Brother: A special meeting will be held Wednesday evening, May 11, at 7:30, to decide whether or not we will call for strike against Lake Carriers' Association.

"'J. E. KOHNERT, C. C.'

"Inasmuch as the advisory council of the Masters' and Pilots' Association have repeatedly stated that they had full authority to act except on wages, and on this point had agreed and concluded that they ought to resubmit that question to the various lodges, and had positively agreed that they would not only recommend, but would urge its adoption by their members, the Lake Carriers' executive committee awaited confidently favorable action upon which a contract would be drawn up and executed. So positively was this indicated by the advisory council that the manager of the largest lake fleet announced his appointments of masters and called his masters for a conference in Cleveland yesterday morning, in the belief that the whole matter had practically been adjusted. To his intense surprise, after he had made the call, he was notified by Captain Howell, the district captain and lake manager of the Masters' and Pilots' Association, that he (Captain Howell) had countermanded the invitation of the manager to his captains and notified the manager that in consequence none of his captains would appear at the proposed conference. The manager immediately asked Howell just what was the position of the Masters' and Pilots' Association, now that the referendum vote had rejected the compromise proposition of the Lake Carriers' Association. Howell replied that all negotiations that had been made between the Masters' and Pilots' and the Lake Carriers' Association were declared off, and that they would not sail any boat except on the stringent conditions and the schedule which they originally presented, with full season's pay; an increase to masters of almost 14 percent on the larger vessels and a much greater increase on smaller boats; also that the mate's wages would be increased so as to give them pay for a full season regardless of when they report for duty.

"The purpose of incorporating the Lake Carriers' Association, which does not own or directly operate vessels, was to enable definite arrangements to be made, fair and equitable throughout, with the various kinds of labor employed in operating the vessels. It was so organized in the confident hope that the men and their various organizations would be equally fair, and would also recognize with us that the interests of the employer and employees are one and inseparable; and that in working out the problems involved the representatives of the various organizations would bind their organizations as the lake carriers' executive committee does bind the lake carriers.

"The hope was that the cool judgment of both sides, under conditions apparent to all, would coincide and result in better conditions to all concerned. This hope has so far been disappointed in only one instance, and the present deadlock results from the demands of the Masters' and Pilots' Association for higher wages and more onerous conditions than have ever obtained on the lakes. On the part of the lake carriers we have offered the wages of last season, with the assurance that all members in the association this year would pay the standard lake carriers' wages of last year. The lake carriers can only lament a condition by which of an average crew of about twenty, three men, by virtue alone of their government licenses, are tying up the entire business of the lakes, and these including the men trusted as the personal representatives of the owners, vested by law with high and responsible powers; action which is stopping wages to the amount of many thousands of dollars each day to the vessel crews, and said to deprive not less than one hundred thousand men of employment in the various branches connected with the traffic.

"The lake carriers' executive committee feel that they have sought in good faith to avoid this condition by every consistent and reasonable endeavor.

"W. LIVINGSTONE,
"President Lake Carriers' Association."

District Captain Paul Howell, of the Masters' and Pilots' Association, in reply to President Livingstone's statement, says that the executive committee of the union went out from its conference with the owners and recommended the acceptance of the proposition agreed upon, but that the men voted this recommendation down. He contends that the men are only asking for a small portion of advances they should have had some years ago. The $1,900 salary referred to by President Livingstone is only paid, Howell says, to a few men, while in many cases $1,000 to $1,200 is paid. A uniform wage scale is what is wanted and he recommends that if the owners cannot pay what is asked on account of the alleged poor outlook, they keep their boats tied up until conditions improve.

General Manager Coulby, of the U. S. Steel Corporation fleet, cites as indication of the fairness of the Lake Carriers' As-

sociation the fact that it has dealt this year with seven unions and with six of these made settlements entirely satisfactory to the men.

CHICAGO MACHINISTS MAY STRIKE.

(Special Telegram.)

CHICAGO, May 18.—A deadlock has resulted between committees representing the local district of the International Association of Machinists and the Chicago Metal Trades Association in their negotiations for an agreement for the year ending April 30,1905, and the possibility of a strike is therefore greatly enhanced. About two months ago the local unions voted to demand an increase from the minimum rate of 30 cents an hour to 33½ cents per hour, and President O'Connell was called in to help get it. After many conferences, the committee representing the machinists offered to compromise on 32 cents an hour, but the Metal Trades Association firmly adhered to its original position that the business situation did not justify an advance and would consider an agreement only on the old basis of 30 cents an hour and a nine hour day, with the exception that the employers demanded that roughing out work be done by handy men and others not classed as machinists. Last Sunday the unions in mass meeting took another hand in the matter and voted to declare a strike today if their demands were not granted or a settlement reached. Conferences have since been held daily, the meeting yesterday being protracted until after midnight. No decision was reached and the meeting adjourned after both sides had declared they had presented their ultimatum. As the matter stands now, the Chicago Metal Trades Association declares the next move must be made by the union.

OPEN SHEET AND TIN PLATE MILLS FAVORED.

In his annual report, presented at the annual convention of the Amalgamated Association of Iron, Steel and Tin Workers, now in session at Cleveland, President Shaffer recommended declaring open all the non-union iron and steel mills of the country to association members. Owing to the idleness of a large number of the members of the association, especially sheet and tin workers, the open mill was deemed expedient temporarily. As yet no action has been taken but it is altogether probable that after July 1 the non-union mills of the country will be open to these union workers. During the past year the non-union mills have operated while many of the union mills have remained idle, this is especially true of the mills operated by the American Sheet & Tin Plate Co. By the course proposed it is believed that the association's strength can be extended and that many of the present non-union mills can be enrolled among those controlled by the Amalgamated Association.

The iron scale according to reports has been adopted and is practically the same as last year's scale. A few changes have been made in the footnotes.

METAL TRADES ASSOCIATION NOTES.

CINCINNATI, May 17.—W. J. Fairbairn, secretary of the Milwaukee Metal Trades and Foundry Bureau, reports the records of his office for the month of April show a slight improvement in the condition of shops of the members. This was especially noticeable the latter part of the month.

A slight disturbance among the coremakers at the Stowell Manufacturing and Foundry Co. of South Milwaukee was reported to the association and speedily settled early in the month.

A. C. Fischer, general secretary of the Employers' Association of Grand Rapids, Mich., is mailing a letter to the different employers' associations, citizens' alliances, etc., for the purpose of securing their co-operation.

Frank A. Wilson, secretary of the Boston Labor Bureau, reports a slight improvement in business.

Geo. M. Cooper, secretary of the Manufacturers' Association of Pittsburg, advises that there will be a general meeting to discuss what shall be done at the expiration of the present agreement with the molders on Friday, May 27.

The machinists' union of Quincy, Ill., is investigating the tax records of that city to find out whether the concerns who locked them out have been paying the proper amount of taxes.

Commissioner DuBrul and Secretary Wuest are attending the convention of the National Association of Manufacturers at Pittsburg this week.

The International Association of Machinists has insisted that the members of Egypt Lodge No. 665 at DuQuoin, Ill., shall have no voice in local affairs and shall continue to be governed by the business agent of the district, who is located in St. Louis.

The new association certificate of recommendation for employes which will be issued shortly will embody several new features, the most prominent of which will be a complete identification of the holder. The form will be printed on bankers' safety paper, thereby preventing the possibility of trafficking in these certificates.

There is no change in the boiler makers' situation in New York.

There is not much likelihood of a machinists' strike being called in Chicago owing to the great number of machinists who are on strike along the line of the Santa Fe railroad.

The conference committee of the Chicago Metal Trades Association have submitted to council of the International Association of Machinists, District No. 8, an agreement covering the question of wages, hours, overtime, etc., to take effect as of May 1, 1904, and so remain until May 1, 1905.

One of the subjects up for discussion at the Pittsburg convention of the National Association of Manufacturers is that of strike insurance.

LABOR NOTES.

The foundrymen and molders of Minneapolis and St. Paul have not yet succeeded in arriving at a settlement. There have been several conferences but without result. The molders wish to retain the agreement of last year, while the employers want some changes.

Members of the Illinois State Board of Arbitration have been instrumental in settling the controversy between the molders of Belleville, Ill., and their employers. The working contracts of all foundries for the year 1903 are to be in full force until May 1, 1905.

In violation of their joint agreement with the Chicago Metal Trades' Association, 80 union machinists in the employ of E. Goldman, 39th and Union streets, Chicago, went on strike without first submitting their grievance to arbitration.

The alleged refusal on the part of a number of boiler manufacturers of St. Louis to recognize the Boilermakers' Union resulted in a strike of 300 members of that union. About 150 sheet iron workers and 150 helpers quit work in the same establishments because they said an advance of 5 cents an hour was refused them.

President Charles Mellen, of the New York, New Haven & Hartford road has made the following statement concerning labor troubles on the road: "Many local grievances were brought to the attention of the management which were quickly remedied to the satisfaction of the men. It being shown to the committee that this company was paying the highest rate of wages of any road in this territory, and that the business prospects were far from encouraging, the question of an advance in wages was dropped."

The drillers and hoist engineers engaged on the works of the Canadian Niagara Power Co. and the Ontario Power Co. on the Canadian side at Niagara Falls went out on strike last week, affecting between 300 and 400 men and practically tying up the contract work at the two plants. The contractors will not concede the increase in wages demanded by the men and state that they expect to be able to fill the strikers' places.

The dispute between the molders and the management of the Sharon, Pa., plant of the American Steel Foundries Co. has been settled and the plant resumed full operations on the 10th inst., after a shut down of six weeks. The plant employs nearly 400 men.

The Freeport Spring Co., of Sterling, Ill., has its plant in running order after its recent fire. The business will be enlarged the coming season and ampler quarters secured.

As a result of the bi-monthly wage adjustment of the bar iron scale made at Cleveland last week there will be no change in the puddling and finishing rates for the months of May and June.

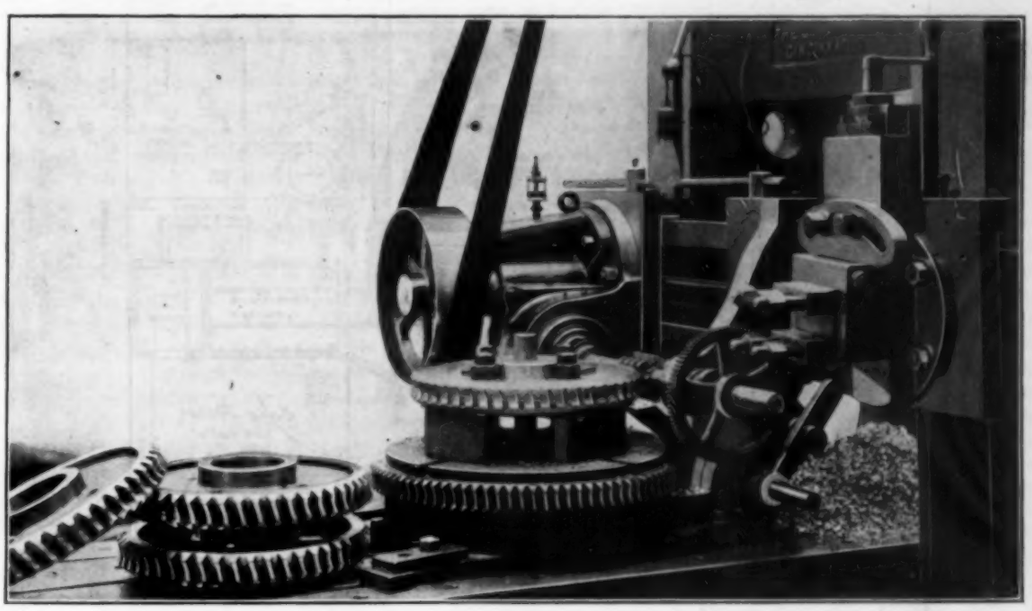
THE FARWELL MILLER FOR WORM WHEELS.

Among a number of successful ways of using the Farwell miller, and the most recent, is that illustrated in the accompanying view, which shows the miller at work hobbing bronze worm wheels. The bronze blank is properly set on the revolving table, which is turned at proper speed to allow the hob to be fed into the blank without first being slashed with a single cutter. The table is driven by a worm which engages the teeth on the edge of the table. Gears of proper ratio between hob and worm insure the correct speed of the table. By changing the hob, blank and gears a great variety of worm wheels may be cut.

In the Adams Co.'s shop, Dubuque, Ia., where the Farwell miller is made, this method of cutting worm wheels is employed on four sizes of wheels, two of which are single thread wheels and two double thread wheels. The miller is designed for use in combination with the planer and is made in four sizes.

To Manufacture Refined Iron.

The Iron Co. of America, composed almost entirely of capitalists of Scottdale, Pa., will shortly apply for a Pennsylvania charter with a capital of $250,000. The company has purchased an idle rolling mill at Roanoke, Va., and will place it in operation at an early date. Refined iron after the Robinson process will be made at this plant. By this process iron can be produced which has all the qualities of charcoal refined iron, and tests made at Washington, Pa., recently proved very successful. The iron is first treated in a primary furnace in charges from eight to ten tons each, the furnace being similar to an ordinary open-hearth furnace, and the pneumatic process being employed. After this the iron is poured into molds and then broken up, after which it goes through another refining process in an ordinary puddling furnace. It is estimated that the output of the Roanoke plant will be about 100 tons a day. The directors of the company are David S. Loucks, B. F. Overholt, L. H. Leitzell, W. W. Francis, W. L. Kelly, M. B. Porter, Richard Robinson, G. C. Broomall and E. M. Whippa.



THE FARWELL MILLER ATTACHMENT CUTTING WORM GEARS.

The Buffalo, Rochester & Pittsburg railroad has ordered 300 steel coal cars, 300 flat cars, 400 wooden gondola cars and 37 miscellaneous cars from the American Car & Foundry Co. The Lehigh Valley has placed an order with the Baldwin works for 10 locomotives. The American Locomotive Co. is building 18 engines for the Lake Shore railroad. This makes a total of 60 locomotives ordered since the first of the year by the Lake Shore.

PLANS FOR CARNEGIE TECHNICAL SCHOOL.

The architectural plans for the Carnegie Technical School to be erected at Pittsburg provide for six groups of buildings with a total floor space of 580,000 feet. The groups are divided as follows:

Group I.—Administration: General office, 2,000 square feet; faculty rooms, 2,500 square feet; a suite comprising general reception room, a social room for men and a social room for women with a total area of 8,000; an auditorium with 16,500 feet on the main floor; a men's club with 10,000 feet area; a women's club with 4,000 feet; fire proof vault, 5,000; gymnasium, 15,000, and a director's residence with 15 rooms, some of which would be arranged for official entertainment. The total area of group 1, exclusive of the director's residence, is 90,300 square feet.

Group II.—The School of Applied Science; Superintendence and general, 13,000; general instruction and service, 14,000; machine design and construction, 16,000; structural steel design and construction, 12,500; industrial, metallurgical and electro-chemical courses, 6,900; mining practice, 12,000; railroad practice, 12,100; applied electricity, 13,200; clay-working and ceramics and manufacture of glass, 17,800; foundry practice, 35,300; steel manufacture, 15,200. Total for group, 181,600.

Group III.—School for Apprentices and Journeymen; Superintendence and general, 11,300; general instruction and service, 16,800; carpentry, 4,000; cabinet and wood-working 3,400; patternmaking, 8,000; electrotyping and stereotyping, 4,400; electrical work, 7,400; house, fresco and sign painting, 10,000; use of structural steel and iron, 7,000; steam and hot water heating, sheet metal and cornice work, 12,800; blacksmithing and machine forging, 10,600; plumbing, 6,400; masonry, bricklaying and plastering, 9,000; printing, 6,400; mining machinery, 7,400; stationary steam engineering, 4,400; founders' and molders' work, 6,400; machinists' work, 10,000. Total for group, 145,700.

Group IV.—Technical School for Women; Superintendence and general service, 8,600; professional housekeepers, dressmakers and costume designers, 12,100; librarians and secretaries, bookbinding, 10,000; stenographers, typewriters and bookkeepers, 6,700; leather work and upholstery, needle work and embroidery, 10,200; milliners, dressmakers' assistants and seamstresses, 13,200; working housekeepers, housemaids and laundresses, 8,400; cooks and waitresses, 6,400; general instruction, 18,900. Total area of group, 94,500.

Group V.—School of Applied Design; Superintendence and general, 9,500; interior decoration and design, 12,000; ceramic art, 9,500; elements of architecture, stained glass and stone carving, 7,400; repousse work, glass blowing and leather work, 7,400; typographical art, 10,300; art needlework and furniture design, 11,800. Total for group, 67,900.

Group VI.—Heat, Light and Power Service; Power house, 7,500; fuel storage, 1,500; building for general purposes, 3,000. Total for group, 12,000.

The Universal Exposition.

(Editorial Correspondence.)

ST. LOUIS, May 16.—The Louisiana Purchase Exposition is easily in point of size beyond its predecessors. In the item of acreage alone it has over three times the space occupied at Buffalo. The Pan-American had 300 acres, the Paris Exposition of 1899-1900 had 336 acres, the Columbian Exposition at Chicago had 633 acres, while the latest effort in exposition construction has an enclosure of 1,240 acres, a space measuring roughly two miles long and one mile wide. These and many other figures are presented by the guides and they suggest interesting comparisons to those attracted by statistics or to the favored few familiar with the international expositions of the past. The St. Louis Exposition has many points in common with others, but apart from the vast expanse over which its treasures are spread there are especial features of interest. The ground has rolling grades and on the apex of a little hill is Festival Hall and stretching down the slope is a series of terraces. A waterfall sends down its flood by many steps to the lake below and on either side, radiating from the hill and the cascades like the ribs of a fan, are the main buildings. The length and number of these have been published frequently and need not here be repeated. They are wooden structures of imposing architecture superficially and in their fresh coating of staff and paint have most attractive exteriors. The Intramural Railroad has started operations on its seven-mile right of way and one may travel around the grounds on the cars and enjoy the external beauties of many of the buildings to the full. The structures, with their gaily flying flags, remind one constantly of other exhibitions, but a determined effort has been made to get something of a unique character about the buildings, nevertheless. The White City of Chicago and the color effects at Buffalo lent an individuality to the general design and here the peculiar charm of the scheme has been sought in the ivory tint of the exhibition buildings. It has not been a thorough success from the standpoint of uniformity, but the stickler for verbal accuracy may claim that it is all the more correct because of the uneven tint of ivory, which varies from white to yellow. Age, as in the case of genuine ivory, will doubtless deepen and soften the contrasting shades to the rich depth of the desired color in due season.

A number of the buildings on the grounds are a part of Washington University and stand out ruggedly substantial in a class by themselves. They are the permanent elements of the exposition and will abide when their magnificent neighbors have been cast to the winds by destructive dynamite or torn down with scant ceremony by wreckers. Many of the heavier statues and purely ornamental works at Buffalo were so destroyed, although a great part of the buildings there, as here, is subject to salvage.

Unreadiness of Exhibits.

Inside the buildings is the greatest contrast imaginable. Some exhibits are in place, complete and perfect; then there are others. The Brown & Sharpe Mfg. Co. (in the Palace of Machinery) has had a long experience with the successive exhibitions here and abroad and everything was ready for inspection so far as the firm was concerned, but the walk on one side was being laid ten days after the exposition was opened and not far away a temporary railroad track extended through the building. A locomotive crane of the Brown Hoisting Machinery Co.'s construction is still doing work along this track with promise of being busy for some days. One exhibitor has a train of freight cars not yet unpacked and there are many unfinished exhibits, together with the belated contingent who have the potency and promise of exhibition, but not the presence.

It is the same in other buildings and the contrast between the tardy and the punctual is often shown by exhibitors from the same States and localities. The Pennsylvania exhibit in

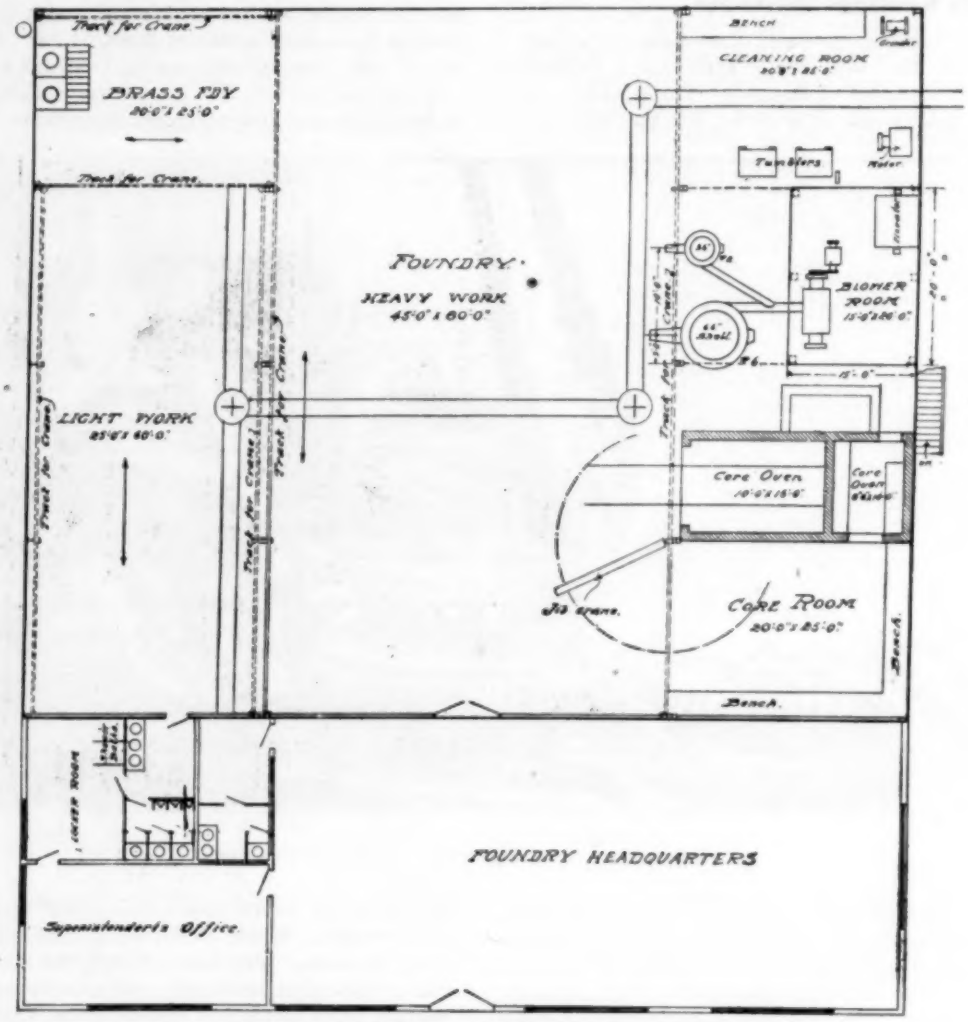


FIG. I.—FLOOR PLAN OF THE WORLD'S FAIR FOUNDRY BUILDING,
Showing the Foundry Headquarters (72 x 52 feet), with Superintendent's Office (16 x 28 feet), Locker and Toilet Room, etc., in front; in the rear of this is the Foundry Building proper (100 x 100 feet), in which is shown the proposed arrangement of the cranes, cupolas, core ovens, etc.

the Palace of Mines and Metallurgy is extensive and well advanced, but the municipal contribution from Pittsburg is wanting. An open space waits for the 60-foot structure of rails from that city, but not a rail or spike is in sight. The Bethlehem Steel Co. has a full size model of a battleship turret with a couple of guns in place. In front of this exhibit there is an array of machine guns, heavy forgings, locomotive wheels, etc. There is also a series of exhibits illustrating materials employed in the production of metal work. These are in regular sequence—ore, coke, pig iron, etc. The ponderous statue of Vulcan in cast iron is not yet completed,

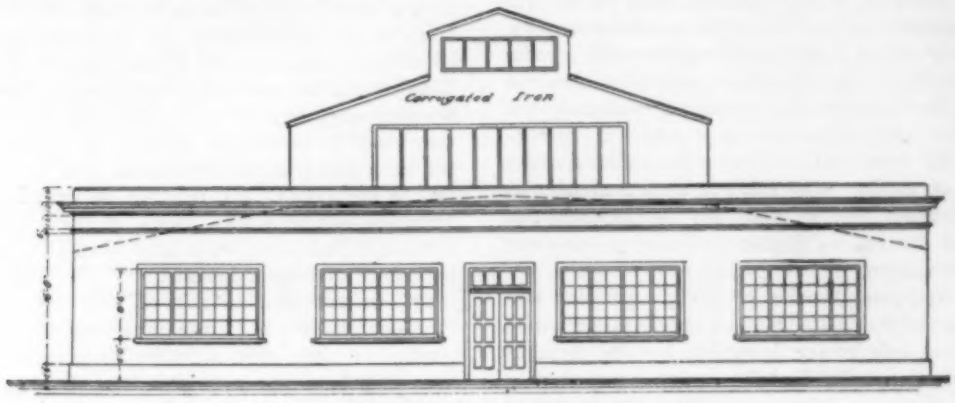


FIG. 2.—FRONT VIEW OF FOUNDRY BUILDING,
Showing the "Headquarters in front, and the Foundry Building proper in rear.

but the major portion is erected and two or three days will suffice to bring the monster parts into position.

There is much to see in spite of the usual incompleteness. But who ever expects an exposition to be in place within a month or two of the opening ceremonies? And it is just this common certainty that accounts for much of the delay. "What's the use?" has a good deal to answer for here and elsewhere.

There is a good theme for thought in the erection of many of the machines and the engineer who brings difficult projects to a finish with a minimum of anxiety is always to be envied in a place of this kind. Accidents are not always avoidable and a mechanic with experience at at least three expositions today lamented the engineering inaptitude of the architects. "These spans could just as well have been uniform in the different parts of the buildings and the columns made with provision for crane runways. The cranes could have been left on exhibition. They would be equally useful at the close of the fair and could then be sold. The cranes would have covered the floor which is not now served by the railroad track. The other day a machine was dropped. Ten tons is apt to do damage and on this occasion the expected happened." The use of traveling cranes would have meant narrower spans and this would detract from the broad sweep of space now presented by portions of the interiors of the main buildings. The 40-ton crane over the center bay at the power end of the Machinery building is and has been very useful. It is about 65 feet above the floor and has a span of probably that distance. Beyond the center of the length of the structure the span is greatly increased and here dependence comes upon the locomotive cranes loaned by the Brown Hoisting Machinery Co. to the exposition authorities.

The Cost of Power.

More serious are the occasional complaints regarding other matters. Perhaps the power question is the most annoying. Exhibitors were especially invited to install running machinery, with assurance that the power would be freely supplied. Late in March, 1903, this was more clearly defined to be as follows:

"Wherever it is possible, exhibiters of machinery should arrange that it be shown not only in motion, but actually performing the function for which it was designed. Ample power will be furnished at reasonable rates, and special consideration will be given to exhibits of this character."

Recently this has been further clarified to the charge of $8o per horsepower for the exhibition season. This is not figured upon the metered current, but the nominal horsepower. A 10-horsepower motor would mean a charge of $800. An exhibitor who will later use power and from whom the above figures are obtained says that his bill for May is now received though his motors are not yet installed. The exhibitors wire the machines to the floor level and the exposition workmen do the rest for a considerable consideration.

But then the exhibition side of the nation's industries is generally assumed to be expensive, so no one is disappointed.

Thursday, May 12, was set apart for an official inspection by the exposition authorities, and last week everything was moving briskly night and day. A few days more and the exhibits will assume a different appearance.

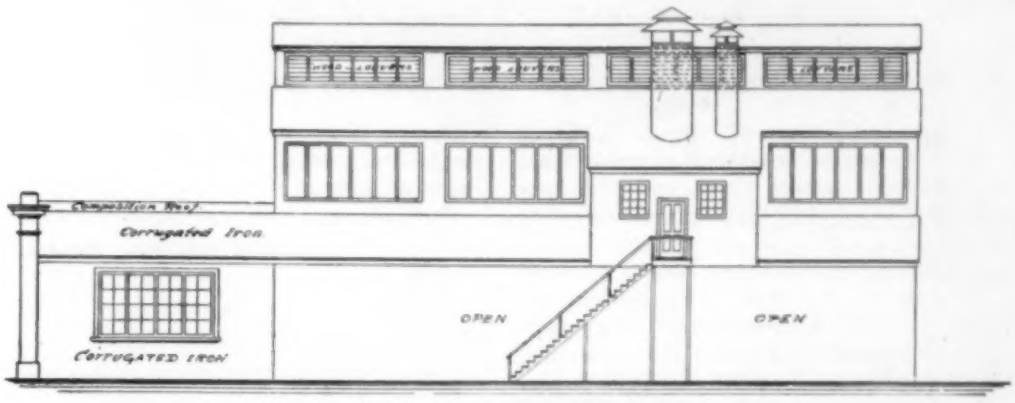


FIG. 3.—SIDE VIEW OF FOUNDRY BUILDING,
Showing the Foundrymen's Headquarters in the one-story front room, and the Foundry Building proper (100 x 100 feet) at the right.

The Model Foundry.

The model foundry building is being boarded over and the three cupolas will soon be placed. Right behind this building will be three coke ovens. These exhibits will all be located and in working order before the convention of the foundrymen, which opens at Indianapolis June 8, and holds an adjourned session in St. Louis on June 11; at least this is the program of Mr. J. A. Holmes, chief of the Department of Mines and Metallurgy, and he is to be classed with the patiently energetic who are bringing things to pass at this

fifty million dollar enterprise. Mr. Holmes gave the writer some particulars regarding the foundry building which is being constructed at the St. Louis exposition as headquarters for visiting foundrymen and as a building for housing the exhibits of foundry equipment and foundry products. The building has a steel frame, with sides of corrugated iron and with roof partly of corrugated iron and partly of composition material. It is being constructed by Messrs. Christopher & Simpson, architectural iron workers, St. Louis.

The part of the building in which most of the foundry equipment will be exhibited, and in which a portion of this equipment will be operated, is 100 x 100 feet, with the general subdivisions as indicated on the floor plan and cross-section. Attached to the front of the foundry building proper is a room 100 feet long by 32 feet wide, the larger portion of which is to be used as a headquarters for foundrymen visiting the exposition. At one end of this space is arranged a superintendent's office, toilet room and a locker room. The foundry headquarters will be further subdivided in such a manner as to make it a convenient meeting place for foundrymen, and as a suitable place for the exhibition of foundry drawings, patterns, small castings, etc.

When the accompanying drawing of the ground plan was prepared it was expected that the foundry room proper would be 100 feet wide and only 80 feet in length, but the demands for space in which to exhibit foundry equipment renders it necessary to add on the additional 20 feet to the length of the foundry, making this part of the building 100 feet square.

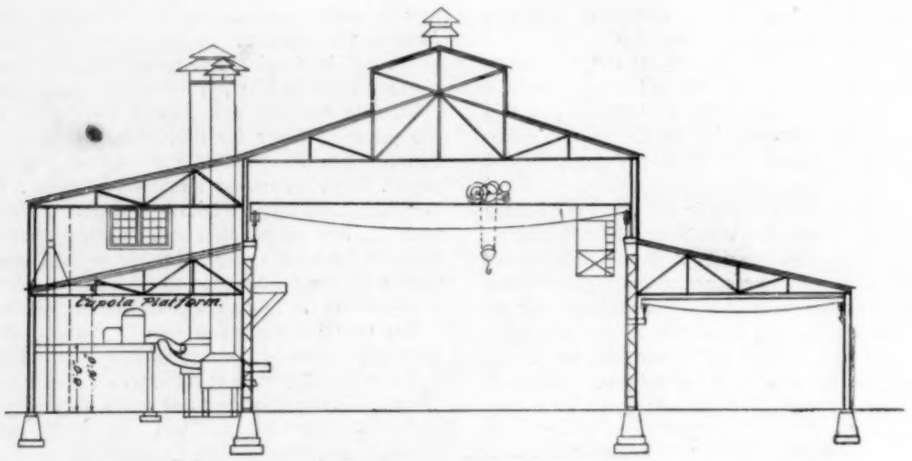


FIG. 4.—CROSS SECTION OF WORLD'S FAIR FOUNDRY BUILDING; 100 FEET WIDE BY 132 FEET LONG.

The details shown in the arrangements of the ground plan will be subject to change during the installation of the exhibits. The installation of cupolas, cranes, core ovens and some of the heavy material is expected to begin by the 20th and to be completed by May 30.

Immediately adjacent to this foundry building is a smaller metal pavilion, 60 x 100 feet in size, in which has been arranged a laboratory for making analyses for foundry materials and products and equipment for such lighter foundry work as electroplating, etc.

On another area adjacent to the foundry building will be installed a battery of coke ovens and a coal washery plant in which an elaborate series of experiments will be carried on during the summer and autumn seasons, in order to test the coking qualities of coals from different parts of the United States, and the extent to which the quality of the coke made from the different coals may be improved by first washing the coal of a considerable portion of its sulphur and ash. In the foundry building itself there will be installed one or more testing cupolas in which the cokes made from the different coals under different conditions will be thoroughly tested as to their suitability for foundry purposes.

It will be seen therefore that the foundry exhibits and the foundry work which is being arranged for at the exposition will not only be of interest to the foundrymen and to the general public, but will, it is believed, have a considerable value in testing the possibilities in the way of improving the quality of the coke for foundry purposes, made from the different coals in the United States

Labor Demands.

The labor question has been a dominant factor in the situation here from the beginning. The administration has been favorable to the demands set up from time to time, so far as these could be conceded, and the exhibiters have therefore fallen heir to conditions for which they are in no wise responsible. Labor is high-priced and independent in manner. The opportunity for squeezing the exhibiter is ready made, as the need is great, while the time for extortion is necessarily short. This applies even to trades that are usually not so directly influenced by union conditions. The engines are handled by the men who have erected them, but there are nominal engineers to meet the requirement that St. Louis men must be employed. One of these, who was applied to for information about an exhibit, very truthfully called himself "a figurehead," and referred the question to the man sent from the engine works. Some of the exhibiters tell of unpleasant things apart from labor troubles. These relate to the procedure of exhibit installation. The national habit of "tipping" waiters—and a "rake-off" is only a variation of the "tip"—means much to the possessor of a well-filled purse. Such a one may judiciously use his resources for bringing his cars ahead of the rest and have their contents unloaded earlier. This is so concededly venial a business, as are some of the features complained of in connection with the negotiations for concessions, that comment will be less disagreeable when the work of installation is but a memory. Perhaps, after all, some of these things are but the outgrowth of methods all too common in everyday business.

Some Interesting Exhibits.

There are interesting features worthy of note by the mechanic in other than the Machinery building. The Northern Electrical Mfg. Co. and the Bullock Electric Mfg. Co. have shop equipments in the Palace of Electricity. These model machine shops comprise the latest types of standard tools, electrically driven of course, and will be operated by machinists conversant with latter-day developments in rapid metal working. The Palace of Electricity has also a notable exhibit in charge of Dr. Zwingenberger. This is the elaborate apparatus of German design for the study of electro-chemistry. The collection is not intended for operative exhibition but as being representative of the work scientifically undertaken by institutes of learning in Germany. The exhibit includes several forms of electric furnaces, the apparatus for handling thermit welds with special crucibles in section, etc., the means for purification of water for drinking purposes, and other industrial applications.

The Varied Industries building has an exhibit of cotton spinning machinery in charge of A. J. Holt of Platt Bros., of Oldham, Eng. The exhibit is of considerable size and comprises the essential machinery for the production of cotton

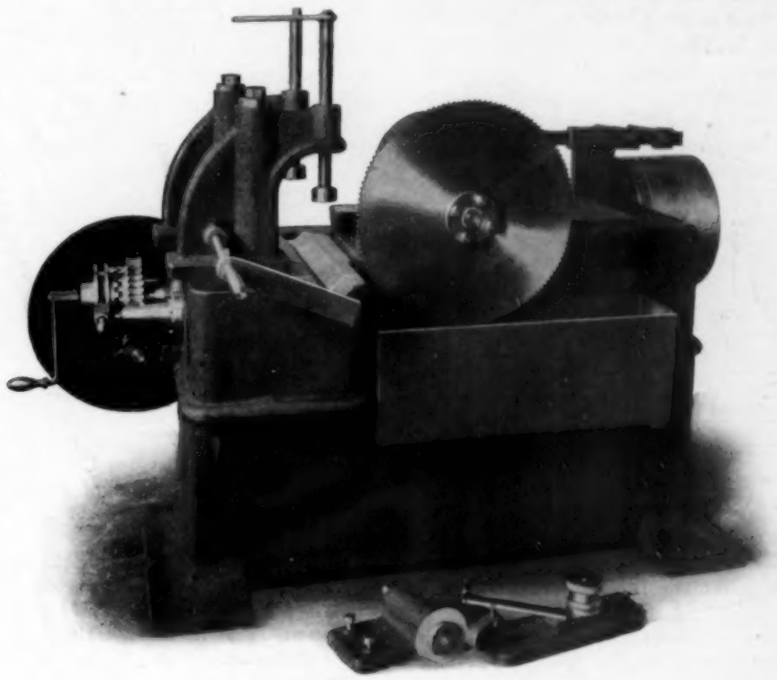
yarns from the bale. There are scutchers, roving, intermediate and drawing frames, mules and spinning frames. Platt Bros. employ about 14,000 people and claim to manufacture everything they use except iron. The machines are neatly finished in black or polished, the firm preferring the plain finish to the elaborate colors and gold striping in use by some American manufacturers of textile machinery. The castings are smooth and sound but Mr. Holt asserts that there is no extra finish on them and that the smaller ones are simply tumbled and have no other treatment. This statement is probably true but the smooth surface of the separators between the spindles of the spinning frames is well worth examination, the separators being about ¼-inch thick, nicely rounded with no fins or flats. The builders send many machines to this country and have brought the spinning spindle to a high degree of perfection. The original Rabbeth spindle invented by a native of New England is shown along with the most modern form. It must be remembered that textile machinery is often handled by the young as well as other immature assistance and the appliances for preventing injury to the operators are quite obtrusive. The gears are all enclosed and the bonnets and doors connected with latches to the belt shifters. Take one of the roving frames, for example, and the large double door covering the driving gears cannot be opened when the belt is on the fast pulley. Nor is it possible to start the machine if the door should be left open. Should the oiler be in the act of lubricating gears or their bearings, neither he nor anyone else can start up the machine. This plan is carried out on all the machines with such modifications as the particular cases may require. The mule frames run out on tracks and the supporting wheels have guards to push a foot or any obstruction off the rails without injury. Even the frame of the head-stocks has been designed so that the hand carelessly laid upon any part of it is still in safety, a provision which has entailed the lengthening of webs, etc., in an interesting manner. Mr. Holt says that is well worth while on account of the humane principle involved and is absolutely essential in some countries; Russia, for example, where the employer must continue to support the injured employe for the balance of his life. The entire exhibit will be electrically operated during the exposition and will attract much attention. R. I. C.

The Commonwealth Steel Co.'s plant at Granite City, Ill., has not been shut down since it started, except for two weeks during the high water of June, 1903. A recent newspaper paragraph referring to the "Commonwealth Steel Co., of Madison, Ill.," preparing to start up after a long shut-down was incorrect.

COLD SAW WITH GRINDING ATTACHMENT.

The success of a number of cold saws has led the makers, John T. Burr & Sons, of Brooklyn, N. Y., to design the No. 3 size with a capacity up to 6 inches, rounds or squares. The design is modern in every respect, the frame being of the pedestal type and low, to avoid lifting stock, further than necessary.

The drive is through a steel worm, with ball thrust bearing, carefully hobbed worm wheel, and a pair of wide face steel pinions. Tight and loose pulleys on the worm shaft make a counter shaft unnecessary, and the double-crowned tight pulley provides a drive for the saw grinding attachment, furnished with each machine. The feed is simple and effective and of the friction type, giving a complete range from slowest to fastest by simply changing the position of the friction roller. The disc is keyed to the feed worm, which meshes with a hobbed worm wheel clutched to the feed screw. The automatic feed is thrown in by simply engaging the worm wheel clutch, and an automatic trip disengages the feed at any desired point of the carriage travel. The carriage is very heavy and is substantially gibbed to the bed. The saw-arbor and worm wheel shaft are of large diameter, and have long bearings. The carriage has a travel of 8 inches on the bed, adding to the usefulness of the machine on special work.



A NEW COLD SAW WITH GRINDING ATTACHMENT.

The vise arches are heavy and strong, and are held down firmly by T-slot bolts. One or both arches may be removed, and work clamped directly to the table by special binders and T-slot bolts. The saw is 16 inches in diameter by ⅛-inch thick, and is held to the arbor collar by four screws. The saw runs in a large oil basin, which will hold the chips of at least a day's cutting.

The grinding attachment furnished with each machine is an efficient tool for the purpose. The emery wheel spindle is driven by a belt from the pulley on the driving shaft. The saw is placed on the grinder slide, which is provided with an adjustable stop, so that each tooth may be ground to exactly the same depth, and a tooth gauge, as in a cutter grinder, registers the teeth to the wheel. The attachment, when not in use, is easily and quickly removed from the machine. The weight of the machine is about 1,500 pounds.

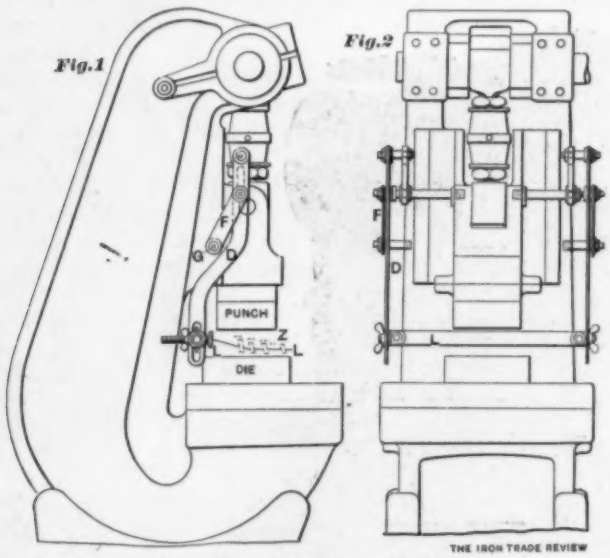
The Madisonville Wagon Co., Madisonville, Ky., recently incorporated, means the continuation of the business heretofore conducted by a firm under the same name. The company has its plant completely equipped and does not contemplate any additions.

FINGER GUARD FOR PUNCHING PRESSES.

London *Engineering* illustrates as shown below in Figs. 1 and 2 a new safety device which has been invented by A. Burchard. The cut shows a power press fitted with a finger guard, which protects the attendant against accident; and as the die is cleared when the ram is up, the die is accessible for placing the work. In the illustration the ram is in the top position, its successive positions being indicated by the lines Z, the corresponding positions of the guard being shown by L L. It will be seen that the pin connecting the link F to the guard carrying arm D is forced to swing around the stationary center G. The pin gets its downward movement from the ram, and as it swings around the center G it forces the finger guard forward between the punch and the die. This design is suitable for a great variety of presses, and the stroke of the guard can be varied as required by choosing the centers properly.

Production of Lake Superior Copper in 1903.

The Lake Superior copper production for 1903, as shown by official reports just completed was 192,620,065 pounds, a considerable increase over the rate of recent years. The total for 1902 was 171,679,018 pounds, for 1901 it was 155,718,848 pounds, and for 1900, 142,151,571 pounds. The increase is coming out of new mines and this is likely to be emphasized in the coming year. At present the lake country is making



FINGER GUARD FOR PRESSES.

copper at the rate of about 17,500,000 pounds a month, which is far above the average monthly rate of last year, but the increase in 1904 cannot maintain this average.

One of the interesting exhibits at the World's Fair, St. Louis, in connection with the display of the United Coke & Gas Co., the construction department of the Semet-Solvay Co. controlling by-product coke oven construction in this country, is a 3½ foot cube of coal weighing exactly one ton furnished by the Washington Coal & Coke Co., Pittsburg, and taken from the company's No. 1 Washington mine. Washington coal was taken because it is a representative coal from which to make by-product coke and that from which the best results have been obtained. The exhibit of the United Coke & Gas Co. consists of charts, maps and drawings showing the construction of the Semet-Solvay by-product coke ovens. It was the original intention of the company to have the exhibit include several by-product ovens but the time for erecting these ovens was too short.

The Lackawanna Steel Co. has in service at Buffalo a number of Vanderbilt steel flat cars built by the Bethlehem Steel Car & Foundry Co. These cars are made entirely of structural steel except the floor which is of wood. The car is designed to carry a uniformly distributed load of 100,000 pounds between bolsters or a concentrated load of 55,000 pounds between needle beams. The special feature is the sill construction whereby any desired strength can be obtained by deepening the sills.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Alford Window Lift & Safety Lock Co., New York, has been incorporated with a capital of $100,000. Incorporators are: Charles J. Basit, 308 East 124th street; Joseph W. Y. Alford, 253 Broadway, and George M. Bechtel, 59 West 69th street.

The Church Balanced Impact Steam Turbine Co., New York, has been incorporated with a capital of $750,000, for the manufacture of steam turbines, engines, etc. F. J. French, 20 Broad street, New York, is promoting the company.

The Trebert Auto & Marine Motor Co., Rochester, N. Y., has been incorporated with a capital of $25,000, to manufacture gasoline engines. Incorporators and directors for the first year are: Henry Trebert Sr., Arthur P. Schwab and Catherine Schwab, Rochester.

The Sargent Engineering Co., Bronxville, N. Y., has been incorporated with a capital of $100,000. Directors are: A. F. Kountze, O. S. Lyford Jr., and T. B. Meigs, all of New York; F. J. Meigs, of Tupper Lake, and A. W. Lawrence, of Bronxville.

The M. Hertenstein Co. has been incorporated for the manufacture of iron and sheet steel cooking stoves, ranges and heaters. Incorporators are: M. Hertenstein, C. Hertenstein, Theodore Aust Jr., and C. D. Aust.

The Sibley Machine Tool Co., South Bend, Ind., has been incorporated with a capital of $70,000. Incorporators are: Albert P. Sibley, E. E. Sibley and O. W. Sibley.

The Beard Automatic Car Coupling Co., Birmingham, Ala., has filed a declaration of incorporation, the capital stock being fixed at $100,000. The officers are: J. A. Pritchard, president; A. J. Beard, vice president and F. M. Love, secretary and treasurer.

Proposals will be received by the University of Illinois, Urbana, Ill., until 5 o'clock, May 23, for the enlargement of the foundry and for other improvements.

The Grenada Machine Works is the name of a proposed enterprise at Grenada, Miss. It will be capitalized at $20,000, with C. B. Bolton, W. A. Rock and others as incorporators.

The Youngstown Furnace Co., Youngstown, O., has been incorporated with a capital of $25,000. Incorporators are. Frank H. Jennings, Leon Gschwind, Charles F. Ohl, C. E. Gschwind and Lewis H. Young.

The M. D. Knowlton Co., Rochester, N. Y., has been incorporated with a capital of $400,000, to manufacture machinery. Incorporators and directors for the first year are: M. D. Knowlton, Frederick K. Knowlton and Annie D. Knowlton, all of Rochester.

The corner stone of the first building of the Farmers' Co-operative Harvesting Machine Co., of Springfield, O., will be laid on May 21. The policy of the company is to enlist the support of farmers and mechanics. The stockholders will be principally farmers who will be consumers of the product. The company is not prepared to go into details as to its plans, but expects to extend operations as capital is available.

The Trumbull Mfg. Co., operating the Warren Machine Works, Warren, O., will be in the market June 1 for cast iron and malleable fittings and globe valves. It would like catalogues and specifications of manufacturers.

New Construction:—

The additions and improvements which are being made to the plant of the Power & Mining Machinery Co., at its Cudahy, Wis., plant will quadruple the capacity. President Guggenheim announces that further additions will probably be made in the near future.

As soon as the Burlington road completes the work of laying the switch to the site to be occupied by the Wenzlemann Mfg. Co., Galesburg, Ill., work will be commenced on the four new buildings to be erected by that company. The buildings will be: One 52 x 176 ft., which will contain the office, pattern room and store room; the second, of the same dimensions, will be the machine shop; the third will be 60 x 176 ft. with an L addition 50 x 50 ft., the main part to be the foundry, and

the L the power house. The fourth building, a factory for the manufacture of chemicals and machinery for the manufacture of chemicals, will be 60 x 176 ft. The plant of this company at Streator, Ill., is now running to its fullest capacity under the management of E. H. Overholt, who will continue in charge there, while Gustav Wenzelmann, president of the company, will supervise the construction of the new buildings. As soon as these buildings are completed the company will remove its machinery and plant from Streator to Galesburg.

The Chicago Steel Mfg. Co., Hammond, Ind., has let the contract for its new plant at New Castle, Ind., to the Carnahan Mfg. Co., Loogootee, Ind. The building will be 170 x 225 ft. The company will operate 102 cut nail machines with a daily output of 750 kegs. The company will also install a plant for making agricultural shapes to the extent of 15 tons per day. It expects to be started in this new location by July 1. It will not need any new equipment, as it will move its machinery from Hammond to New Castle.

The Pennsylvania railroad has invited bids for the erection of its proposed car and locomotive repair shops near Trenton, N. J. These will be built of brick, six in number, as follows: erecting and machine shop, blacksmith shop, wood working and paint shop, paint and oil house, office and store house, laboratory and locker building.

Authority has been given to the Pittsburg division of the Pennsylvania railroad to construct a machine shop at Pitcairn, Pa., at a cost of $30,000 and an interlocking plant at Bradenville, Pa., at a cost of $30,000.

The Colonial Foundry & Machinery Co. was organized at East Norwalk, Conn., 18 months ago. During that time it has more than doubled its size and a number of improvements are now being made. A new 20-ton cupola is being erected, a new core oven is being built and other improvements are being made.

The York Mfg. Co., York, Pa., has started on the erection of a new pattern shop which will be 65 x 115 ft. The crane building, a large frame structure in which small cranes are manufactured, will be moved to a new location.

Improvements that will largely increase the capacity of the Anderson, Ind., plant of the Nicholson File Co., are approaching completion. The plant for many years located at Beaver Falls, Pa., is being consolidated with the works at Anderson.

The Meade Roofing & Cornice Co., Philadelphia, has let the contract for the erection of a new building 60 x 205 ft., office building 45 x 60 ft., and smaller buildings covering an area 22 x 284 ft. The company will soon purchase the necessary sheet metal and cornice working machinery for equipping the buildings.

The Wing Engine Co., Boston, Mass., recently incorporated, expects to install a plant to build sample engines, it being the company's intention to license other manufacturers to use its inventions on a royalty.

The Southern Iron Works, Churchville, Tenn., which were destroyed by fire a few weeks ago, are to be rebuilt on a much larger scale. Work on the erection of the new buildings was commenced a few days ago. A complete line of hardware cast iron specialties will be manufactured.

The Philadelphia & Reading railroad has purchased 27 acres at Newberry Junction, Pa., upon which to erect shops and a foundry.

The Advance Machinery Co., of Toledo, O., has purchased a site 110 x 210 feet, and expects to begin within ten days the erection of a two-story brick building 60 x 150 feet. It has not been decided whether electric motors, gas engine or steam engine will be installed. The company manufacture a line of wood-working machinery, including a glue spreader, band saw, trimmer, dovetailer and shaper. Another product is a line of copper glue heaters which have been on the market for the past two years, and are now in use in Great Britain, Canada and throughout the United States.

The Pittsburg and Valley Districts;—

Stack No. 3 of the Ohio plant of the Carnegie Steel Co., Youngstown, O., was blown in after an idleness of about four months. The stack has been cut down 16½ feet and is now 90 feet high, the reason for the reduction in size being assigned to the more economical working of the smaller furnaces. The new stack now under construction and known as No. 4 will be ready to blow in about the middle of June. It is also 90 feet high, while the other two furnaces at this plant are 106½ feet. No steps have yet been taken looking towards the shortening of these furnaces, but it is altogether probable that this will be done when they need relining again.

The Neville Island furnace of the American Steel & Wire Co., near Pittsburg was blown out last week for relining. This stack has been working badly for some time and it is probable that numerous changes will be made.

The Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., resumed operations this week after a week's idleness. The accumulation of orders during the week will insure a steady run for some time.

Henry Aiken, mechanical engineer, Pittsburg, has brought suit against the Carnegie Steel Co. Ltd., for alleged infringement of patents. The principal suit is based on the method of producing ingots, on a patent secured in 1891. Previous to this time ingots were produced in rectangular molds, but this patent provided for their production in wedge shaped molds. Seven suits are brought on ingot molds alone. One suit is on an ingot extractor, another on a tongs, operating apparatus, while still another is on an alleged infringement of a patent secured jointly with Frederick Wood on an apparatus for extracting ingots.

The Pittsburg Terminal Warehouse & Transfer Co. will proceed shortly with the erection of warehouses and transfer stations on the Monongahela river and a large tonnage of steel will be required in the erection of the buildings. Thirty-eight warehouses 20 x 155 feet in dimension and six stories high will be erected while the transfer station will be two stories high and will cover an area of about 40,000 square feet. The company is now offering $1,000,000 of five percent first mortgage gold bonds through the Pittsburg Trust Co.

The George M. Bole Construction Co. of Pittsburg, has been incorporated with $5,000 capital for the purpose of engaging in the structural engineering and contracting business. George M. Bole, John Jobson and H. Bials are the incorporators.

The city of McKeesport, Pa., has vacated nearly ten miles of streets in order that a continuous site for the $10,000,000 plant of the National Tube Co., to be erected at that place could be secured. While all the buildings on the property purchased by the company have been razed, the erection of the plant has not yet been commenced.

The Alliance Tube Co., of Tarentum, Pa., has purchased a site of five acres at that place and will shortly proceed with the erection of a tube plant. The property lies between the West Penn railroad and the Allegheny river and is admirably adapted for manufacturing purposes. Boiler tubes will be manufactured exclusively. The officers of the company are Charles Bailey, chairman; Joseph Kelly, secretary and Charles C. Henderson, treasurer.

The Buckeye Sand Co., miner and shipper of Conneaut and Kingsville molding sand, with offices in the Ferguson building, Pittsburg, and the Schofield building, Cleveland, has purchased the output of the banks of the Union Sand Co., West Springfield, Pa., for a period of five years.

The Youngstown Furnace Co., Youngstown, O., has been organized with $25,000 capital for the purpose of engaging in the manufacture of hot water, steam and hot air furnaces. For the present the furnaces will be built by contract but later a plant will be erected. The incorporators are Frank H. Jennings, Leon Geschwind, Charles F. Ohl, C. E Geschwind and Louis H. Young.

The removal of the Walker plant of the American Bridge Co. to Ambridge, Pa., from West Homestead has been completed. The site of 112 acres has been sold to the Mesta Machine Co., while the buildings were sold to A. & S. Wilson.

The North Sharon, Pa., plant of the Carnegie Steel Co. was shut down last week temporarily. The plant has been operating on billets, but it is desired to roll skelp and the necessary changes will now be made. Owing to the great activity of the plants of the National Tube Co., the demand for skelp is heavy.

The Pittsburg & Lake Erie railroad has commenced condemnation proceedings to secure the old mill site of Phillips, Nimick & Co., Pittsburg. The owners estimate its value at about $250,000.

Bids are being received for the erection of the South Side

elevated branch of the Wabash-Pittsburg Terminal Railroad Co. at Pittsburg. The extension will be about 2,500 feet long and will be double tracked throughout. About 5,000 tons of steel will be required.

The Reisinger-Prather Co., of Pittsburg, engineers and contractors received the contract for installing the power, heating and ventilating plant for the 18-story building that is being erected by John D. Rockefeller at Cleveland.

Fires and Accidents:—

Dilley's foundry, at Pine Bluff, Ark., was damaged by fire on May 6. The fire originated near the core oven. The loss is fully covered by insurance.

General Industrial Notes:—

The Salem Iron Works, of Winston-Salem, N. C., state in a recent letter that they feel that there is a good opening for a malleable iron plant in that town, either in connection with one of the gray iron foundries or as an independent operation. They feel sure that some local capital could be interested in the venture and would like to get into communication with some one who has had experience in the malleable business.

The Dewey Sash Weight Co. has purchased the plant and stock of the Enterprise Foundry Co., Denver, Colo., and is continuing the business as heretofore and expects to increase its facilities.

The Commissioner of Indian Affairs has awarded to the Indiana Wire & Steel Co., of Muncie, Ind., a contract for $50,000 worth of wire fence to be used on certain Indian reservations.

Efforts of the mayor and a committee to interest Joseph E. Schwab, in Waukegan, Ill., as a site for his proposed steel foundry have elicited from Mr. Schwab the following statement: "While I have not as yet decided the matter definitely, I much prefer locating my plant a little nearer Chicago than Waukegan, and it will therefore be unnecessary for me to make any appointment with you looking to this end."

Several meetings of former employes of the defunct Ohio Iron Co., of Zanesville, O., have been held with a view to perfecting a plan for purchasing the plant and conducting it on a co-operative basis.

Two hundred men in the employ of the Lake Shore railroad in its shops at Collinwood, O., have been laid off. It is understood that men will be laid off along the entire line until the working force has reached the minimum or until conditions change for the better.

American condensers are to be installed in the large power house which is being constructed at Chelsea, London, S. W., by the Underground Electric Railways Co., commonly known as the Yerkes Snydicate, in which a number of Americans are interested. The International Steam Pump Co. secured the contract, which is valued at $125,000. The British Westinghouse Electric & Mfg. Co., Ltd., secured the contract for the electric equipment which will represent an expenditure of fully $3,000,000.

The last of 24 locomotives hurriedly built in Philadelphia for the Japanese government, have been boxed and sent to New York for shipment to the far East. Other locomotives have been sent to Japan via San Francisco.

The John A. Roebling's Sons Co., Trenton, N. J., has reduced its time of work to four days per week. The company employes 4,000 men.

The Mason Machine Works, Taunton, Mass., have made arrangements to manufacture the Campbell printing presses and autoplates. It is expected that the transfer of the company's business from Plainfield to Taunton will be made this summer.

The plant which has been occupied by the Barbed Wire Fence Co., North Fairmount, Cincinnati, has been sold to the M. A. Hunt Co., manufacturer of spring beds, now located on Water street, Cincinnati. The building is a four-story brick containing 76,000 square feet of space, with about 4 acres of ground. The consideration was $35,000.

The Adjustable Wrench & Specialty Mfg. Co., Harvard, Ill., has recently purchased the old W. R. Rollins plant in that city and is remodeling the interior and adding some new machinery for the manufacture of wrenches. The wrenches it will manufacture are made of the very best machinery steel and finished in excellent shape. The feature of the wrenches is the adjustable part. Instead of the old time ratchet that has to be screwed from large to small adjustments and back, the user of this wrench merely slides the whole jaw, then by giving it a slight turn when the adjustment is made, the jaw is positively locked and will remain so till the user desires it to change.

The Alabama Consolidated Coal & Iron Co. has purchased an additional blowing engine for the stack now in operation at Gadsden. There is no truth in the report that the company will build another blast furnace.

The Boston & Albany railroad advises us that it has not, as reported, abandoned its shops at Rensselaer, N. Y., but that it is very probable that they will be kept open this summer.

The plant of the United States Cast Iron Pipe & Foundry Co., at West Superior, Wis., has resumed operations after a shutdown during the winter months.

The C. Pardee Works, Perth Amboy, N. J., are making arrangements to start their two new 25-ton open-hearth furnaces and their rolling mill.

The Crescent Tightener Co., Wichita, Kan., is now having the Crescent wire tightener manufactured at St. Charles, Ill., near Chicago, and is shipping from that point. The company expects to build a plant at Wichita, but its plans are not perfected and it is not in the market for equipment.

The Evart Tool Co., Ltd., Evart, Mich., organized on April 11 with a capital of $10,000, has increased its capital to $12,000 and admitted as a member of the company, G. R. Tummonds, who had been with the Champion Tool & Handle Works of Evart for four years. The new company will manufacture cant hooks, peavies, pike poles, skidding tongs, lug hooks, and cant hook and peavy handles, and in fact everything in connection with the logging trade.

The Indiana Iron Works, Muncie, Ind., have resumed operation after being idle about six months, giving employment to 700 workmen.

The Sharon, Pa., plant of the American Steel Foundries has resumed operation after several weeks of idleness, giving employment to 400 men.

Alfred F. Morency and Joseph L. Maniere, doing business under the firm name of the Union Brass & Iron Works at Detroit, have sold their plant to the Peerless Heater & Valve Co.

The Elkhart Bridge Co.'s plant, Elkhart, Ind., has been leased to G. C. Berkey, Fred Fahlgren and Frank Brumbaugh. Mr. Brumbaugh will be the manager.

The corporation of the Oswego Machine Works, Oswego, N. Y., has been dissolved. The plant will be operated by Niel Gray Jr., as sole proprietor, under the name of Oswego Machine Works.

The National Brake Co., Buffalo, N. Y., was erroneously referred to last week in these columns as the National Air Brake Co. The company does not manufacture air brakes.

At a meeting of the Buffalo & Susquehanna Iron Co., Buffalo, held on May 12, the following directors were elected: William A. Rogers, Frank H. Goodyear, Charles W. Goodyear, Hugh Kennedy and S. M. Clement.

The open-hearth steel plant of the Lackawanna Steel Co., Buffalo, will be in operation early in June. The company will soon thereafter enter the market with its open-hearth finished product, including bars, plates and structural material.

The Dean Mfg. Co., Seymour, Wis., jobber in mill supplies, has been incorporated recently for $26,000. The company built a new machine shop and foundry last year and it is completely equipped.

No sale was made of the plant of the Alabama Tube & Iron Co. at Helena, Ala., advertised to take place April 30. The property is in the hands of the Birmingham Trust & Savings Co., of Birmingham, Ala., under an agreement of creditors, and this company is empowered to sell either at public or private sale. The mill is equipped for turning out 75 tons of ⅜-inch to 2-inch wrought iron pipe per day.

The "S-C" Regulator Co., of Fostoria, O., recently incorporated, does not contemplate building, having let a contract for a year to have its "S-C" water lever regulator manufactured by a local firm.